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King, John

KING'S

ECLECTIC OBSTETRICS

Rewritten, Revised and Enlarged

BY

ROBERT C. WINTERMUTE, M. D.

**PROFESSOR OF OBSTETRICS AND DISEASES OF WOMEN AND CHILDREN IN THE ECLECTIC
MEDICAL INSTITUTE OF CINCINNATI.**

NINTH EDITION.

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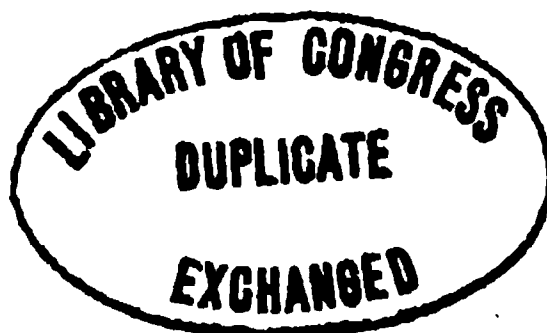
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ROBERT C. WINTERMUTE, M. D.,
133 W. Seventh Street, Cincinnati, O.:

DEAR SIR—When my feeble health, two years ago, compelled me to resign my position as Professor of Obstetrics, I realized that I would never have the strength to revise my book on Obstetrics. I had felt the necessity for such a revision for several years, and the question arose—who would do it? Fortunately, you consented to undertake the work, although already burdened by the duties of your Professorship of Obstetrics and Diseases of Women and Children, in my place, at the Eclectic Medical Institute of Cincinnati. Your task for more than a year has been a difficult one, but your faithful work has at last been completed, and I offer you my congratulations on your success. I now feel that my confidence in you was well placed, and that the new Obstetrics will be all that is required by practitioners and students, especially in regard to the use of specific remedies and therapeutics. Yours, very truly,

NORTH BEND, O., May 27, 1892.

John King

PREFACE TO NINTH EDITION.

ON being called to the chair of Obstetrics in the Eclectic Medical Institute, two years ago, my attention was at once called to the fact that a new and revised edition of the text-book of the department was badly needed. The broken health and advanced age of the author rendered it impossible for him to undertake the work; it thus devolved upon me to make the revision. Arrangements being completed with Dr. King, I at once set about the task of overhauling the old and building up the new. The great advance that has been made in the art and science of obstetrics during the past fourteen years (the time since the last revision by Prof. King) has rendered necessary a thorough and systematic rewriting of the entire work, in order to bring it up to the present state of knowledge on the subject. I assumed the responsibility of the work with a very keen sense of the many difficulties and great labor involved in the undertaking. Numerous and extensive additions have been made to every chapter of the work. Especial attention is called to the treatment of the diseases of pregnancy; specific medication being substituted for the old style of prescribing. Where reference is made to remedial agents, the specific tinctures peculiar to the eclectic school of medicine are understood.

For valuable suggestions from Prof. J. M. Scudder, and the late Prof. Howe, also cuts Nos. 50, 55, 76, and 81, kindly loaned me by the latter, I must acknowledge my obligations.

This work is here submitted to the profession in the hope that, as now issued, it may meet the requirements both of a text-book for the student and a work of reference for the busy practitioner, as I have endeavored to present a clear and practical description of the subject in question.

R. C. WINTERMUTE, M.D.

CINCINNATI, *July 1*, 1892.

PREFACE TO THIRD EDITION.

IN presenting this new edition of the "American Eclectic Obstetrics" to the profession, it may be proper to state that the work has been subjected to a thorough revision. For the purpose of presenting a more regular and systematic study of the subjects treated upon, some modifications have been made in the arrangement of the First and Second Parts of the previous edition, which it is believed will meet with the approval of the reader.

Owing to the publication of the American Dispensatory, and various other Eclectic works on *Materia Medica* and Practice, in which the therapeutical agents pertaining to the department of Obstetrics are fully and accurately described, it has been deemed advisable to omit Part Six of preceding editions; this exclusion has permitted considerable additions to the work without an unnecessary increase in the number of its pages. Some idea of the additions made may be formed, when it is observed that at least seventy pages of the last edition have been entirely excluded, the greater portion of which is, in the present work (and independent of revisions and other additions), occupied with new and valuable matter (about sixty-three pages). The recent progress in the Obstetrical Department of Medical Science has rendered these additions very necessary.

It has been the Author's endeavor to render the work satisfactory, thorough, and essentially practical for both practitioners and students, and he confidently believes that it will be found at least approximating these qualities, and in no way secondary to its predecessors.

For the many favors and kindnesses received from Eclectics, and from the medical profession generally, the author avails himself of this opportunity to express his assurances of great regard and profound gratitude.

JOHN KING.

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KING'S

ECLECTIC OBSTETRICS.

THE ART OF MIDWIFERY, AND SCIENCE OF OBSTETRICS.

CHAPTER I.

WOMAN.

THE professional delivery of women has been an art ever since the human race had a history—ever since the race began—and improvement in methods took place as observation extended and experience developed knowledge. During periods of savagery and barbarism there may have been little progress in the rudest of arts, when knowledge was traditional, and nothing was recorded for the instruction of coming generations. The wives of the builders of the pyramids and the bondwomen whom Moses led out of Egypt were delivered with some degree of skill—with the advantages to be derived from experience; yet enlightened obstetricy was evolved only as progress developed in other branches of learning. Substantial progress is of slow growth. Great discoveries do not spring from the brain of anybody as fabled Minerva came from the head of Jove. The art of delivering a parturient woman is merely a professional matter—a degree of tact acquired by the ordinary midwife, and not much improved upon; but the science of obstetrics pertains to the evolution of the human race, and bears upon the origin and descent of mankind.

The science of obstetrics takes philosophical cognizance of differentiation in sex; woman is to be studied in all her peculiar physical, mental, moral, and sentimental peculiarities, and as a creature quite at variance with man—her companion and admirer. Woman is not originally *sui generis*, but spiritually peculiar. She is moved by sentiments her partner in life never feels; she is swayed by impulses a man never experiences.

A French writer, Colombat de L'Isère, says of woman: "Feeble and sensitive at birth, and destined by nature to give us existence; and by means of her tender and watchful care to preserve us afterward, woman, the most faithful companion of man, may be regarded as the very complement of the benefits bestowed upon us by the Divine Being—as an object fitted to excite our highest interest, and as presenting to the philosopher, as well as to the physician, a vast field for contemplation.

"What subject, indeed, is more worthy of our attentive meditation than the series of changes—physical, moral, and physiological—that accompany every stage of woman's existence. Through a long succession of modifications and revolutions, she discloses all the phases of her constitution. In infancy she differs slightly from the male in whose pleasures and amusements she participates, as well as in his dispositions and tastes, his inconstancy and vivacity. At that early period—ignorant of her own sex, ignorant, so to speak, of her own nature—the blush of modesty does not mantle on her cheek: and her eyes, which reveal no passions, seem to seek only what has reference to her real wants.

"Although at this early epoch her body is but a sketch of the forms it is destined to assume at a later period, she always retains, even after her entire development, some touch of the softness and delicacy peculiar to her childhood, and does not depart so widely as her playmate from the idea of her original constitution.

"The reproductive faculty divides the life of the female into three very distinct periods or stages. In the first, this property has no existence: in the second, it is in full activity; and in the third, it has become null again. The duration of the first, commonly decides that of the two last periods; so as to establish the general rule that the old age of woman comes earlier in proportion as her puberty has been more precocious.

"The vital forces that regulate the organic system, and the organs that constitute that system, gradually increase during the first period

of life: they attain their perfect development; and diminish and become extinct at the close of the third, whose term, like that of the others, may be accelerated or retarded by different accidental causes and circumstances, dependent on certain physical and moral conditions.

“Upon setting out in the career of life, the two sexes exhibit nearly the same physiognomical characters and the same delicacy of organization. Their type and their character, as yet indeterminate, differ only by almost imperceptible modifications, and which it is not possible to trace out in full detail. Subject to the same functions and wants, their isolated and individual existence fails, as yet, to reveal the sympathetic relations that are in the end destined to establish between them a state of reciprocal dependence. Subjects of the same kind of diseases, they are principally liable to the convulsive affections, and especially to inflammation of the brain, because the head, which in infancy has a proportional size greater than in any other age, is in them a vital center, towards which almost all the efforts of the organisms are directed.

“The shades of difference in the sexes soon assume a more decided tone, and their peculiar characteristics become so much the more marked as the development of each individual is more perfect and approaches more nearly to the period when by a sudden change nature reveals the completion of those preparations she has been silently making.

“The interval between the tenth year and the age of puberty is a period of transition, a sort of passage from childhood to adolescence, which appears to be the happiest era in the life of a female. Her extreme nervous mobility prevents her being too deeply impressed by the grave sentiments that might be fitted to interfere with her happiness. As this stage is for young women the period of gentle pleasures and of the most unrestrained gaiety, it follows that imagination exhibits every object under the most attractive colors, and that the existence of young females is agreeably varied by a piquant freedom of action and a great mobility of tastes and affection. Exempt, at this age, from cares and troubles, they sing, they weep and laugh at the same moment; and, as their joys, so their pleasures and their griefs, as well as all their impressions, are ephemeral; they proceed along a flowery path up to the age when nature calls on them for the tribute which they owe to the species.

“The young girl who, until now, was an equivocal non-sexual creature, becomes a woman in her countenance and in all the parts of

her body: in the elegance of her stature and beauty of her form; the delicacy of her features; in her constitution, in the sonorous and melodious tones of her voice, in her sensibility and affections, in her character, her inclinations, her tastes, and even in her maladies. Very soon all the tracts of resemblance between the two sexes are found to be effaced. The bud newly expanded blossoms among the flowers, and this brilliant metamorphosis is signalized by the rosy tints of the cheeks and lips, and the perfect development which discloses the arrival of the age of puberty.

“This important period, this first moment of triumph, in which nature seems to renew herself, is announced by a sentiment of necessity to multiply, within—the principle of life—and by various striking and admirable phenomena which put an end to the social inertia, in which the young girl has lived from the period of her birth. The sexual system soon becomes a centre of fluxion; nature makes great efforts to establish the periodical discharge, and the whole machine, in its inmost recesses, experiences a succession, a violent commotion, a general movement. The new energy of the womb imparts a powerful impulse to the entire system of organs: their functions become more active; the body grows rapidly; the various portions of the figure become more expressed and bring out those graceful contours, that belong to the tender sex alone. At the same time other important changes take place: the pelvis and the sexual organs, which were in a merely rudimental condition, now acquire their full proportions; the throat rises and becomes more sensitive; the breasts become rounded and full, while they establish their correspondence of sympathy with the womb. The mons veneris comes into complete relief, and clothes itself with a thick down, which, like a veil covering the organs of modesty, seems to announce that they are destined soon to become fitted to act the important part assigned to them by the law of nature. The meshes of the cellular tissue, becoming rapidly filled under the influence of the uterine irradiation, soon impart to the surface of the body a voluptuous *embonpoint*, which lends the highest splendor to the attractive freshness and beauty of youth.

“The physiognomy of the young woman has now acquired a new expression: her gestures bear the stamp of her feelings; her language has become more touching and pathetic; her eyes, full of life but languishing, announce a mixture of desires and fears, of modesty and love—in fine, every thing conspires to excite, to caress, and to incite.

“Her tastes, her enjoyments, and her inclinations are likewise modified; her most pressing want is to experience frivolous emotions; she is passionately given to the dance, to show and to company; the curiosity so natural to her sex acquires new force and activity; she devours books of romance, or, more than ever fervent in devotion, is excited by the expansive passions, and particularly by religious piety, which is to her a sort of love.

“At this brilliant period of life, her moral, which depends upon her physical condition, undergoes great mutations. The young girl becomes more tender-hearted, more sensitive, more compassionate, and appears to attach herself to every thing about her. The new sensations arising within her soul make her timid in approaching the companions of her childhood; a strange trouble, a sort of restlessness and agitation before unknown, are the heralds of a power whose existence she does not even suspect.

“The action of the new forms of vitality established within the sexual organs augments more and more, and reacts with energy upon the whole system. Under the sympathetic irradiations of the uterus the general sensibility becomes changed and even excited in a peculiar manner. A new sentiment soon gives rise to desires which, as yet, have no definite object, and to vague emotions, of an instinct that seeks some object—it knows not what. This rising want produces the impression of a touching melancholy, a charming bashfulness, whose principle is founded in ingenious love presaging new dispositions, and announcing that the inclinations and habits of childhood are exchanged for other sentiments. The young virgin becomes timid, reserved, abstract, and dreaming. She sighs less for pleasure than for happiness; the necessity of loving makes her seek solitude; and this new want, that troubles her heart and engages it wholly, becomes, if it remains unsatisfied, a source of multiplied disorders and derangements.”

Thus I have ventured to introduce the career of woman—the objective feature of the art and science of midwifery. The next step will be to depict the anatomical and physiological peculiarities of such parts of the female organism as are essential to reproduction. It is said, that the boy is the father of the man: and with more propriety it might be declared that the girl is the mother of the woman. The doll is the ideal representative of the race.

CHAPTER II.

THE PELVIS: "TRUE" AND "FALSE"—DIFFERENCE BETWEEN MALE AND FEMALE PELVIS: PELVIC ARTICULATIONS, ETC.

THE PELVIS, so named from its fancied resemblance to an ancient basin, is a bony ring-like structure, of conical shape, with the base directed upward; situated between the last lumbar vertebra and the lower extremities, receiving the weight of the body above, transmits it to the lower limbs. It is formed by the union of four bones—viz: the two Ossa Innominata, the Sacrum, and the Coccyx. It is divisible into two parts or cavities, an upper and a lower, the dividing line being the *linea ilio pectinea*. The upper portion is the larger, or *False Pelvis*, formed solely by the alæ ilia. The lower is the smaller, or *True Pelvis*, formed by the sacrum, ilium, pubis, and ischium.

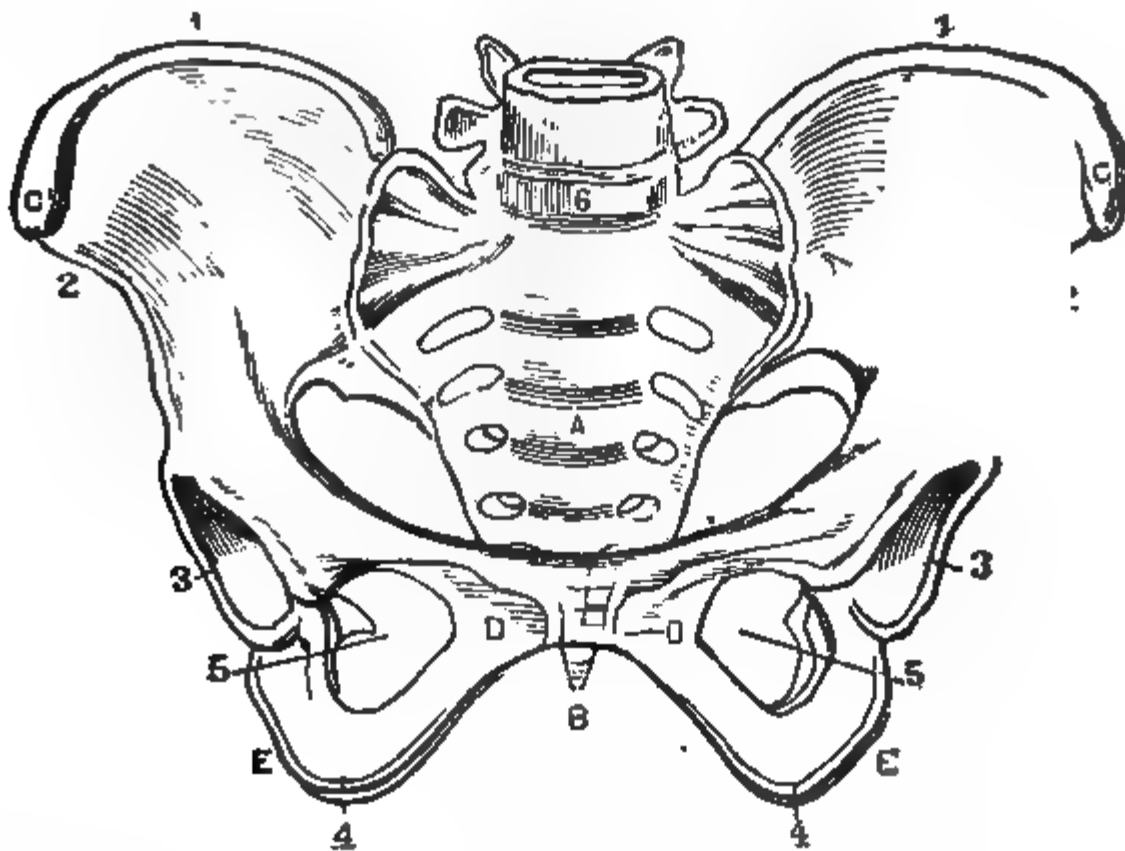
FIG. 2.

ADULT MALE PELVIS.

The SACRUM is situated on the superior-posterior part of the pelvis, immediately below the last lumbar vertebra, with which its superior surface articulates, above the os coccyx, and between the two ossa innominata, to each of which it is united by means of ligaments. It is a large bone, pyramidal or triangular in shape, the base being

upward; its anterior face is smooth and concave, and its posterior irregular and convex. The concavity of its interior face is from above downward, and its depth, in a well-formed pelvis, is such, that a perpendicular let fall from a line, drawn from the apex to the base of the bone, upon the deepest point of the concavity, will measure from nine to twelve lines, or from three-quarters of an inch to an inch; this concavity is termed the *hollow of the sacrum*; it may, however, vary very much, and when too strait or too much curved, it presents an obstacle to the easy passage of the child's head through the excavation.

FIG. 3.



ADULT FEMALE PELVIS.

- | | |
|------------------------------|--|
| A. The Sacrum. | 2 2. The Anterior-superior Spinous processes of the Ili. |
| B. The Os Coccyx. | 3 3. The Acetabula or Cotyloid Cavities. |
| C C. The Two Iliac Bones. | 4 4. The Tuberosities of the Ischia. |
| D D. The Two Pubic Bones. | 5 5. The Obturator Foramina. |
| E E. The Two Ischial Bones. | 6. The Promontory of the Sacrum. |
| 1 1. The Crest of the Ilium. | |

During childhood, the os sacrum is composed of five distinct pieces, termed *false vertebrae*, which become firmly consolidated at adult age, and leave five surfaces nearly quadrilateral, and which are separated from each other by four projecting transverse seams or ridges, at the original points of separation. At the sides or lateral portions of these seams, are a series of openings, termed *foramina*, usually four on each side, which terminate outwardly in large grooves converging to each other, and which are named the *anterior sacral foramina and grooves*,

and which serves to lodge and transmit the sacral nerves coming from the spinal canal. The nervous cords lying in these shallow grooves are comparatively secure from injurious pressure during labor, yet it is sometimes the case, that during the passage of the child's head, these sacral nerves are exposed to much pressure, which, as in other instances of compression upon a nerve, occasions a numbness, pain or severe cramps in the parts to which they are distributed, as in the thigh, leg, or foot. This usually ceases as soon as the pressure is relieved by the expulsive progress of the head, but when the nerves have been severely bruised or compressed, the unpleasant effects may remain for some time after delivery.

External to these sacral foramina, and on the projecting cristæ, which separate the grooves, arise the asperities, which serve as points of attachment to the fibers of the pyriform muscles.

The posterior surface of the sacrum is convex from above downward, rough and unequal, presenting on the median line, four eminences or spinous processes, which decrease in size as they descend; on either side of these eminences, there are four openings or foramina, smaller than those on the anterior surface, which are named the *posterior sacral foramina*, and which transmit the posterior branches of the sacral nerves. External to these foramina are a number of processes, which serve as points of attachment to several muscles and ligaments.

The lateral surfaces of the sacrum are rough, thick above, but diminishing as they descend, and in the recent subject are covered with cartilage, which unites them to the iliac bones. The superior portion of each lateral surface, which articulates with the ilium, is broad and irregular; and the inferior edges are thin and nearly sharp, and give attachments to the greater and lesser sacro-sciatic ligaments.

The base of the sacrum is about two and a half inches thick, and about four inches in breadth and articulates with the last lumbar vertebra in such a manner, as to form a projection at the superior strait, called the *promontory of the sacrum* or the *sacro-vertebral angle*. At the posterior surface of the base, is a triangular aperture, which is the commencement of a canal, traversing the whole extent of the sacrum, which gradually diminishes in size as it descends, and in which the spinal cord is continued. The apex of the sacrum is small, having an oval surface which articulates with the base of the coccyx.

The texture of the sacrum is spongy and cellular, and covered externally by a thin lamina of compact tissue; its length is about four

and a half inches. The union of the sacrum with the ilia is so arranged as to give great firmness and security to its position, so that it may sustain without injury, any weight from within outward, and from above downward; the sacrum entering the ilia like a wedge, having its superior portion broader than its inferior, and its anterior point of union broader than its posterior.

The OS COCCYX or cuckoo bone, so named from its resemblance to the beak of the cuckoo, is the caudal extremity of the spinal column. It is a small, single, triangular bone, the base of which points upward, and unites with the apex of the sacrum by means of an oval articular surface, which, it is said, admits of a backward motion of the coccyx, when pressed by the fetal head, to the extent of half an inch. Yet the firmness by which the coccyx is fastened to the ischia, through means of the sacro-sciatic ligaments, is unfavorable to any such mobility, except by severe and continued pressure. The coccyx is flattened, curved from behind forward, and bears some resemblance to the sacrum, though it differs from it in being much smaller, about one and a half inches in length, and in having no spinal canal. Its anterior surface is slightly concave and rough, and supports the lower extremity of the rectum; its posterior surface is convex and unequal, is separated from the skin only by the posterior sacro-coccygeal ligament, and has inserted into it some of the fibers of the glutæus magnus muscle. Its lateral edges are rough, giving attachment to the small sciatic ligaments and the ischio-coccygeus muscle. Its apex, generally projecting in front, gives attachment to the fibers of the external sphincter ani muscle. In childhood the coccyx is formed of three or more bony pieces, but which become consolidated in adult age. The internal structure of this bone is cellular, and covered externally by a very delicate lamina of compact texture. It is called by the various names of huckle, knuckle, or whistle bone, crupper bone, etc.

The OSSA INNOMINATA, or nameless bones, and sometimes termed the haunch bones, are two in number; they are the largest and most irregular of the pelvic bones, are of a quadrilateral form, contracted in their central portions, and form the lateral, anterior, and inferior portions of the pelvis. Each one of these bones consists, in early childhood, of three distinct pieces, but which become firmly consolidated in the adult. These are called the *os ilium*, the *os ischium*, and the *os pubis*, whose union takes place in the acetabulum or cotyloid

cavity; the dividing lines of these three bones meet nearly in the center of the acetabulum, giving the upper and outer two-fifths to the ilium, anteriorly one-fifth to the pubis, and the remaining two-fifths to the ischium; these several bones entering into the formation of the acetabulum. For purposes of description, and as a matter of more easy reference, the above division is preserved by anatomists.

The OS ILIUM, hip or coxal bone (one on each side of the sacrum, and which form the upper and lateral portions of the pelvis), is the largest bone of the os innominatum, is flat, broad, and nearly triangular in shape. The base or body of the bone is situated at the thick and narrow part which forms the upper portion of the acetabulum, and the large expansion or wing which passes from it, upward and outward, is termed the ala, and which aids in forming the cavity of the false pelvis. The external or femoral surface of the ilium is convex, and is called the *dorsum ilii* or *gluteal region*, having the three glutei muscles lying upon it; and presents below, in its inferior and outer part, a cavity for the head of the femur, called the acetabulum or cotyloid cavity.

The internal or abdominal portion, called the *ventor* or *costa* presents at the upper part a broad, smooth, concave surface, termed the *internal iliac fossa*, on which the internal iliac muscle is situated, and which likewise supports the large intestine; in one of these fossæ, the child's head is placed during the operation of turning. Below, is a prominent ridge or curved line, running from behind forward, that is, from the superior part of the sacro-iliac junction to the top of the pubis, forming part of the *linea ilio-pectinea*, or *ilio-pubic line* which defines the superior strait. The excavation above this ridge, which is also named the *brim of the pelvis*, is termed the false, upper, or superior basin or pelvis, while the cavity below is termed the true, lesser, or lower basin or pelvis, or the pelvic cavity.

The superior or upper convex edge of each wing, is called the crest, or *crista of the ilium*, and to which the principal muscles of the abdomen that are called into action during labor are attached, as the internal and external oblique, and the transversalis; this crest is rough and thick, for the insertion of muscles, is shaped like the letter *f*, being thicker in front and behind than in the middle, and terminates in front, in an *anterior-superior spinous process*, from which some of the muscles of the abdomen and thigh arise, and into which others are also inserted—and behind, in a *posterior-superior spinous process*, underneath each of which processes is a semi-circular notch, terminating

inferiorly in an *anterior* and a *posterior-inferior spinous process*; all of which processes serve as points of origin and insertion of muscles and ligaments. The surface which articulates with the sacrum is rough and irregular. Immediately below the posterior-inferior spinous process is an arched sinuosity, forming at the union of the ilium and sacrum the *great sciatic notch*, which is two inches in depth, and terminates inferiorly, by an acute and sharp spinous process called the *spine of the ischium*, which points backward and slightly inward.

The OS ISCHIUM, *os sedentarium*, or seat bone, occupies the lower part of the pelvis; its base or body forms the inferior portion of the cotyloid cavity, and is very thick and strong. The internal surface of this bone is smooth and slightly concave, and is called the *plane of the ischium*; it is nearly an equilateral triangle, and is three and a half inches in length. The planes of the two opposite ischia incline toward each other, forward and downward, and which convergence exerts an influence on the fetal head during labor, repelling or deflecting the vertex toward the pubic arch, as the head approaches the outlet of the pelvis.

The spine of the ischium, proceeding from the posterior portion of the os ischium, furnishes a place of attachment for the lesser sacro-schiatic or sacro-sciatic ligament; beneath this process is a concavity or notch, named the *lesser ischiatic*, or *sciatic notch* in which the tendon of the obturator internus plays. Below this, is the inferior or lower portion of the ischium, or that part upon which the body rests when in a sitting posture; it is rough, thick, and strong, and is termed the *tuberosity of the ischium*; the great sacro-sciatic ligament arises on the inside of this tuberosity, and its outside, inside, and central surfaces give origin to various muscles.

Passing obliquely from without inward, and from below upward, from the tuberosity of the ischium, is a flat process of bone called the *ramus of the ischium*, which unites with the descending branch or ramus of the pubis, and assists in forming the pubic arch. In the female pelvis, the anterior edge of this ramus is beveled or turned outward, thus affording more space for the passage of the fetal head under the pubic arch. The opening in the anterior part of the pelvis, formed by the ischium and os pubis, is called the *thyroid*, *sub-pubic*, or *obturator foramen*, through which pass the obturator vessels and nerves, and to its inner side is attached the adductors and the obturator externus. This foramen is rounded in man and triangular in woman.

The OS PUBIS, otherwise variously called the shear bone, the cross bone, the bar bone, or pecten, is situated at the inner and anterior part of the os innominatum, and is joined to its fellow of the opposite side, by a union or articulation termed the *symphysis pubis*. It may be divided into, the body, a horizontal, and a descending ramus or branch. The body, or base, of each os pubis is placed transversely before the anterior part of the ilium; and from the side of the body proceeds the horizontal ramus, going outward to meet the ilium. The superior face of the os pubis is flat, and upon its outer and anterior portion is its spinous process, which gives attachment to Poupert's ligament, and from this process two eminences proceed, one passing outward to be lost in the acetabulum; the other, running along the inner margin of the horizontal ramus, is called the crest of the pubis, or *crista pubis*. This ridge is sharp and elevated, and forms the anterior third of the linea ilio-pectineal eminence. The descending ramus of the pubis passes downward to unite with the ascending ramus of the ischium. As with the rami of the ischia, the anterior edges of the pubic rami are beveled or turned outward, affording a sufficiently large and free opening for the fetal head to pass. The descending ramus is connected with its fellow of the opposite side, toward their origin, by a ligamentous substance, called the triangular ligament, which is a part of the interpubic ligament, binding the two tubes together, and rendering the arch of the pubis broader or lower, and also stronger. The *arch of the pubis* is formed on the anterior and inferior part of the pelvis, by the union of the two pubic rami; it is much wider in the female than in the male.

The anterior face of the body of the os pubis is concave and rough, for the origin of the adductor muscles of the thigh; its posterior surface is nearly flat and smooth, but contributing a little to favor the general concavity of the pelvis. The largest or thickest portion of the pubic bone is that employed in the formation of the acetabulum; the next thickest portion is at the symphysis pubis, from which it becomes gradually thinner as it extends toward the obturator foramen.

It will be seen that the ilium forms no portion of the inferior strait, but enters largely into the superior—also that the ischium forms no portion of the superior strait, but only of the inferior—while the pubic bones form a large portion of both straits. Hence a deformity of the ilium would affect only the brim, or the false pelvis; a deformity of the ischium would implicate only the outlet; but a distorted pubes would necessarily involve each of the straits.

CHAPTER III.

SYMPHYSES AND LIGAMENTS OF THE PELVIS.

THE BONES of the PELVIS are united together in such a manner as to give to it great strength, the articulations being effected by means of ligaments and the interposition of cartilage giving support to the trunk and favoring the movements of the lower extremities. The joints to be considered—which have received the name of Symphyses: each symphysis being designated according to the bones which form it—are, the symphysis *pubis*, the two sacro-iliac symphyses, the sacro-coccygeal symphysis, and the lumbo-sacral or sacro-vertebral symphysis. They all belong to the class of joints termed amphiarthrodial.

The SYMPHYSIS PUBIS, or pubic articulation, is formed by the junction of the oval articular surfaces between the bodies of the ossa-pubis. A thick layer of tough fibro-cartilage is firmly united to the articulating surface of each pubic bone; this passes across from one bone to the other, and is so strong as to admit rather of the disruption of the bone than of its own tissue. At the center of the symphysis, and toward the posterior third of the fibro-cartilage, are two smooth, polished, oblong articular surfaces, covered by a cartilage, and lined by a synovial membrane, which arrangement is difficult to detect in man, or even in woman, except when she has died shortly previous to, or soon after, parturition.

Some authorities doubt the existence of a synovial membrane in the pubic joint. The ligaments which strengthen the pubic articulation are four in number: 1, the *anterior pubic ligament*, lying on the anterior face of the symphysis pubis; 2, the *posterior pubic ligament*, which is an expansion of the periosteum; 3, the *superior pubic ligament*, or *supra-pubic ligament*, which supports the superior edge of the pubis, and effaces all its inequalities; and 4, the *inferior*, or *sub-pubic ligament*, which is remarkably strong and thick, and of a triangular form; by some, it is considered as a continuation of the inter-pubic ligament. It adds greatly to the strength of the articulation, and its inferior edge constitutes the *crown of the pubic arch*.

The SACRO-ILIAC SYMPHYSIS, or junction, is the articulation formed by the corresponding rough surfaces of the sacrum and ilium, and of which there are two—one on the right, and the other on the left superior lateral portion of the sacrum. Each of these articulating surfaces has a covering of cartilage, which is thicker on the sacrum than on the ilia, and between which exists a thick, yellowish fluid, which serves to lubricate the parts; and in children and pregnant women there is said to be a synovial membrane in each joint.

The ligaments which aid in strengthening this articulation, are four in number: 1. The *posterior sacro-iliac ligament* fills nearly the whole of the deep excavation comprised between the sacrum and the two posterior spinous iliac processes; their union constitutes a pyramidal ligament, capable of immense resistance. This ligament arises from the posterior and inferior spinous processes of the ilium, and from the margin of the sacrum and coccyx, and passes outward and downward to be inserted into the tuberosity of the ischium; it is broad at its origin, but narrow and thick at its insertion. 2. The *anterior sacro-iliac ligament*, which extends transversely from the sacrum to the ilium, is an expansion of the periosteum of the pelvis, which passes in front of the articulation, and adheres to it but feebly. 3. The *superior sacro-iliac ligament*, which passes transversely from the base of the sacrum to the ilium, is very thick and strong. 4. The *inferior sacro-iliac ligament* arises from the posterior-superior spinous process of the ilium; its superior fibers being inserted below the third sacral foramen, while the lower portion is inserted anteriorly into the tubercle of the extremity of the edge of the sacrum, and posteriorly to the great sacro-sciatic ligament.

The foregoing articulations are still further strengthened by the following ligaments, which pass between the sacrum and ischium, and which assist in completing the parieties of the pelvic cavity—viz.: 1. The *posterior, or greater sacro-sciatic ligament*, which arises from the internal lip of the tuberosity of the ischium, and from its ascending ramus; it is situated obliquely in the posterior-inferior part of the pelvis, is contracted in its center and expanded at its extremities, and passes upward and backward to be inserted into the margin of the coccyx and sacrum, and into the posterior-inferior spinous process of the ilium. 2. The *anterior, or lesser sacro-sciatic ligament*, is placed in front of the greater sacro-sciatic ligament, which it crosses; it arises from the free margin of the sacrum and from all the bones of the coccyx, and is inserted into the summit of the spine of the ischium.

These two ligaments convert the great sciatic notch into two openings or foramina; the upper foramen is the larger, irregularly oval, and transmits the piriformis muscle, the great sciatic nerve, gluteal, ischiatic and internal pudic vessels and nerves, while the lower foramen is of a long triangular shape, and gives passage to the internal obturator muscle and internal pudic vessels and nerves.

The *obturator*, or *sub-pubic ligament*, may likewise be mentioned; it is inserted by its internal semi-circumference to the posterior face of the ascending ischiatic ramus, and by its external semi-circumference to the outline of the obturator foramen. This ligament closes the obturator foramen, with the exception of an opening at its upper part, through which pass the obturator vessels and nerves. The obturator muscles are attached to the two surfaces of this membrane.

The SACRO-COCCYGEAL SYMPHYSIS is the articulation between the apex of the sacrum and the base of the coccyx; it is similar to the joints between the bodies of the vertebræ. The union is effected by two ligaments, and strengthened by an *interarticular fibro-cartilage*. 1. The *anterior sacro-coccygeal ligament*, which arises from the inferior extremity of the sacrum, extends over the whole anterior face of the coccyx, becoming blended with the periosteum. 2. The *posterior sacro-coccygeal ligament*, which arises from the last sacral bone, is inserted into the posterior surface of the second bone of the coccyx. This ligament closes in and completes the lower and back part of the sacral canal.

The *Interarticular Fibro-cartilage*, interposed between the articulating surfaces of the sacrum and coccyx, differs from the ordinary intervertebral cartilage in that it is thinner and firmer; it assists in maintaining the connection between the bones, rendering mobility, it is claimed by some authors, impossible. This joint is undoubtedly subject to slight motion under certain circumstances, which will be noticed further along in the work.

There are, in early life, coccygeal articulations which unite the several pieces of the coccyx with each other; their consolidation takes place more rapidly in males than in females.

LUMBO-SACRAL SYMPHYSIS is formed by the articulation of the fifth lumbar vertebra with the upper surface of base of the sacrum. The oblique position of the bones forming this articulation results in a projection anteriorly, at the superior strait, called the *promon-*

tory of the sacrum, or the *sacro-vertebral angle*. The ligaments of this articulation, in addition to those commonly existing between the vertebræ, are two in number: 1. The *lumbo-sacral ligament* passes from the lower portion of the transverse process of the last lumbar vertebra to the lateral portion of the base of the sacrum. 2. The *lumbo-iliac ligament* passes horizontally from the tip of the transverse process of the last lumbar vertebra to the crest of the ilium, covering the sacro-iliac articulation. The intervertebral disk also contributes to the formation and straightening of this joint, which is one of the strongest of the pelvis.

The *ilio-femoral articulation*, or the junction of the femoral bones with the ilia, in the cotyloid cavity, is a pelvic articulation; it bears no relation to parturition, however, and only needs a passing reference.

MOVEMENTS AT THE PELVIC ARTICULATIONS.

It has long been a question whether the articulations of the pelvis are possessed of any motion. An examination of the method by which the bones are united with each other, and the solidity of their union, would lead us to consider them as perfectly immovable, at least in the ordinary conditions of life. Yet, when we reflect that they are supplied with synovial membranes, which are only found in movable articulations, we may admit them to possess, under certain circumstances, a slight degree of motion, as for instance, the shock of a fall from a height, upon the feet, is much diminished in its influence upon the body and brain, by a slight mobility. Dr. Laborie, from examinations of the pelves of women shortly after delivery, is led to believe that there is a mobility of these articulations tending to enlarge the transverse diameter at the outlet; the other diameters being increased by relaxation of the sacro-sciatic ligaments and the mobility of the sacro-coccygeal symphysis; the sacro-iliac and pubic symphyses presenting characters partaking partly of enarthrosis, and partly of ginglymus.

There is no doubt, but that during pregnancy or parturition, there may be a relaxation, or separation of the symphyses; the symphysis pubis especially being more frequently involved than the sacro-iliac joints: any considerable separation however, favoring marked mobility, is an uncommon event, and one which is seldom met with, being a pathological condition dependent upon some disease of the parts themselves.

For, were it a circumstance common to parturient women, it would be impossible for them to walk or exercise immediately previous, as

well as subsequent, to confinement (acts which are accomplished daily), from the fact that an appreciable degree of mobility would not only render it impossible to walk, but likewise very painful to stand. The tissues about the joints may, probably, become softer, and perhaps more movable during pregnancy and parturition, yet any appreciable relaxation or separation must necessarily be unfavorable, and owe their origin to some disease not connected with these conditions.

When relaxation does take place, the symphyses become swollen, and sometimes dilate so much as to separate the bones which aid in their formation, permitting them to glide over each other, and occasioning uneasiness and fatigue in the movements of the female, with difficulty of standing. Should labor come on, the auxiliary muscles of the uterus, not having any longer a fixed point of insertion in the vacillating bones of the pelvis, draw the symphyses apart, producing great agony; and the female, dreading the pain occasioned by their contraction, remains passive, and allows the uterus slowly and difficultly to expel its contents, unaided by her efforts. Instances of this kind have taken place, and have always proved a source of much distress and suffering, causing more or less intense pain on motion, with much difficulty in moving the lower extremities, and an inability to stand.

Occasionally there is not only a relaxation, but likewise an actual separation of the pelvic joints, giving rise to most intense suffering, inflammation, peritonitis, and all the symptoms of simple relaxation in a more aggravated form, greatly endangering life. This separation may be *accidental*, resulting from the powerful efforts made by the patient to expedite her delivery; or it may ensue from the employment of the lever or forceps in extracting the fetal head. Sometimes it is *congenital*, and usually accompanies exstrophy or extroversion of the bladder, of which it may probably be the result.

There is but little protection given by ligaments to the anterior part of the sacro-iliac symphyses, the only ligament of any size being the anterior sacro-iliac; the principal ligaments are placed on the outer edge of the joint, and any tendency to open at its inner margin is prevented by the ligaments of the symphysis pubis. Hence, a separation of the pubic bones will occasion a relaxation or separation of the sacro-iliac symphyses; and when a separation takes place in consequence of the pubic junction being cut or ruptured, the sacro-iliac symphyses immediately open considerably, the effect of which is pain, inflammation, and, if not remedied, caries of the bone, suppuration of the parts, and hectic fever.

Decided separation of the pelvic symphyses may be diagnosed by carefully examining the parts. When the pubic symphysis is involved, it may be recognized by grasping the symphysis between the thumb externally and one or two fingers within the vagina, with the patient standing; an effort at walking will at once impart the degree of mobility existing between the bones. Rupture of the sacro-iliac joints may be determined by placing the open hands over the symphyses and wings of the ilium, and directing the patient at the same time, to move the lower limbs as in walking; the degree of mobility and separation will at once become apparent. Relaxation or rupture of the pelvic joints may develop during the last months of pregnancy, or not until after labor, and is always attended with pain on the least exertion. Inflammation is occasionally present, and may result in suppuration and the evacuation of pus. Locomotion is usually impaired, and becomes impossible if there exists a decided degree of separation of the symphyses.

TREATMENT.—Rest is the most essential factor in the treatment of either relaxation or separation of the symphyses of the pelvis. It will be absolutely necessary for the patient to remain quiet, and in a recumbent position for a long-continued period of time. The patient must not be permitted to stand on the feet, or attempt to walk; walking, particularly, is likely to prove injurious, and excite inflammatory action. Internal medication is uncalled for in the treatment of this affection. Local agents, to control inflammatory development, and anodynes to relieve pain, may be useful in some cases. The treatment in the main, however, will consist in the application of dressings and bandages, together with such mechanical apparatus as will favor the support of the parts. The pressure of the bandage should be at first gentle, but gradually increased. The bowels should be kept regular, and the surface of the body frequently bathed.

The patient should be advised not to attempt walking too soon after delivery, and when it is considered prudent to test her strength, it must be done with great care. A well-padded leathern girdle should be fixed around the hips, as tightly as the patient can bear, and kept in its place by straps passed under the thighs; the upper part of the body should also be supported on crutches, in order to lessen the weight and pressure of the trunk on the articulations, which must, at first, be unable to maintain its whole weight.

CHAPTER IV.

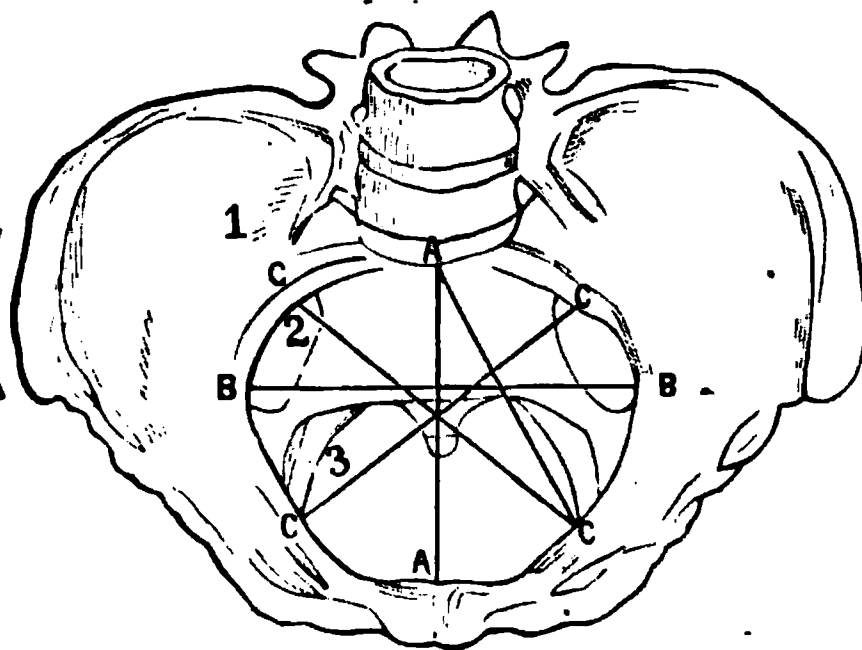
STRAITS AND CAVITIES OF THE PELVIS—THE PELVIS AS A WHOLE.

THE union of the several bones already considered by means of their symphyses or articulations, forms the Pelvis, which is of a conical shape, with its base looking upward and forward, and its apex pointing downward and inward. The internal surface of the pelvis is divided into the *upper basin, false or greater pelvis*, located above the superior strait, and the *lower basin, true or lesser pelvis*, more commonly termed the *pelvic cavity or excavation*, and which occupies the space comprised between the superior and inferior straits—so called because they are rather more contracted than the space between them. The greater pelvis is bounded posteriorly by the lumbar vertebræ, laterally by the alæ ilii, and anteriorly by the abdominal parietes; the lesser pelvis is marked posteriorly by the sacrum and coccyx, laterally by the ischia, and anteriorly by the pubes.

Between these two cavities is an aperture of an elliptical or curvilinear triangular form, somewhat resembling the shape of a playing-card heart, with its base resting on the sacrum, and at which location a prominent ridge is observable, which has received the names of *ilio-pubic line, linea ilio-pectineal protuberance* and *brim of the pelvis*; it is formed by the crest of the pubis, and the ridge which is continuous along the lower part of the alæ ilii, and which, together with the promontory of the sacrum, constitutes the SUPERIOR STRAIT. In

a well formed pelvis its circumference measures from fourteen to sixteen inches. The diameters of the superior strait are as follows: 1. The *antero-posterior or sacro-pubic, or conjugate diameter* (A A, Fig. 4), extending from the superior-posterior edge of the symphysis pubis to the promontory of the sacrum, measures from four to four and a half inches. 2. The *transverse or bis-iliac diameter* (B B, Fig. 4), passing from one ilium to the other,

FIG. 4.



DIAMETERS OF THE SUPERIOR STRAIT.

A A, Antero-posterior Diameter.

C C, Oblique Diameters.

A C, Sacro-cotyloid Space.

B B, Transverse Diameter.

and crossing the antero-posterior diameter, at a right angle, measures five inches. In the recent subject, this diameter is lessened by the psoæ and iliac muscles, which overhang the sides of the brim. 3. The *oblique diameters** (C C, Fig. 4), passing from the ilio pectineal eminence, just above the acetabulum, to the sacro-iliac symphysis of the opposite side, measure, each, from four and a half to five inches. The one passing from the right ilio pectineal eminence, to the left sacro-iliac symphysis, is called the *right oblique diameter*; and that which passes from the left ilio pectineal eminence, to the right sacro-iliac symphysis, is called the *left oblique diameter*. 4. The *sacro-cotyloid space*, or *diameter* (A C, Fig. 4), extending from the center of the promontory of the sacrum, to the ridge just above the cotyloid cavity, measures from three and three-quarters of an inch to four inches.

The articulation of the spinal column with the pelvis, is such, that

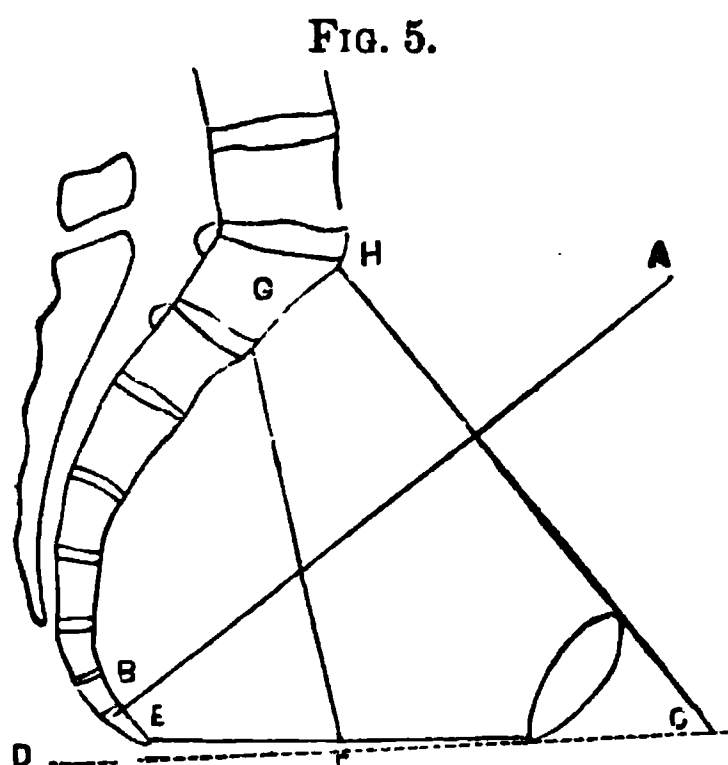


FIG. 5.
A B, Axis of the Superior Strait.
C H, Plane of the Superior Strait.
C D, Horizontal Line.
C E, Plane of the Inferior Strait.
E G, Axis of the Inferior Strait.

the axis of the superior strait is not parallel with that of the body, the superior-posterior part of the pubic symphysis being about four inches below the level of the sacral promontory. If a piece of pasteboard be accurately cut and fitted to the pectineal line, or superior strait, it will represent the *plane* of that strait (C H, Fig. 5), and will be neither horizontal nor vertical, but will form, with a horizontal line, an angle of about 54° to 56° , varying more or less according to the position of the body. The axis of the superior strait will, therefore, be an imaginary

line passing through the center of the plane at right angles (A B, Fig. 5), and will be found to extend from the neighborhood of the umbilicus, downward and backward, to the central portion of the coccyx.

The INFERIOR or PERINEAL STRAIT, also termed the *outlet*

* I am aware that many writers term the oblique diameters, right or left, according to the sacro-iliac symphysis from which they commence their measurements. I have always considered this an incorrect mode of measuring, one less readily comprehended by the student, and consequently instead of taking the posterior extremities of these diameters as the origin, I commence at their anterior extremities, and call the diameter right or left oblique, according as its extremity is situated anteriorly and laterally to the right or left side.

of the pelvis, is bounded posteriorly by the apex of the coccyx, laterally by the inner edges of the ischiatic tuberosities and the sacro-sciatic ligaments, and anteriorly by the rami of the ischia, and the inner edges of the pubic arch. Its circumference measures between thirteen and fourteen inches. The conformation of this strait is apparently very irregular, but if a sheet of paper be applied to it, and its outline traced by a pencil, it will be found of an oval form, with its large extremity pointed backward, and broken by the projection of the coccyx. The diameters of the inferior strait are as follows:

1. The *antero-posterior diameter* (A A, Fig. 6), extending from the lower edge of the symphysis pubis

FIG. 6.

to the apex of the coccyx, measures four inches, but in some women it may be increased to five, in consequence of the regression of the coccyx. 2. The *transverse, or bis-ischiatic diameter* (B B, Fig. 6), extending from one tuberosity of the ischium to the other, measures four inches. 3. The *oblique diameters* (C C, Fig. 6), extending from the center of the great sacro-sciatic ligament of one side, to the point of union between the ascending ramus of the ischium and descending ramus of the pubis, measure, each, from four to four and a-half inches. At the period of delivery, this diameter may be slightly increased, owing to the mobility of the sacro-sciatic ligaments.

DIAMETERS OF THE INFERIOR STRAITS.

- A A, Antero-posterior diameter.
- B B, Transverse diameter.
- C C, Oblique diameters.
- 1. Base of the Sacrum
- 2. Pubic Symphyses and Pubic Crest.
- 3. Anterior-superior Spinous Process of the Ilium
- 4 4. Obturator Foramina.

That which passes from the right lateral anterior region to the left lateral posterior, is called the *right oblique diameter*; and that which passes from the left lateral anterior region to the right lateral posterior, is called the *left oblique diameter*.

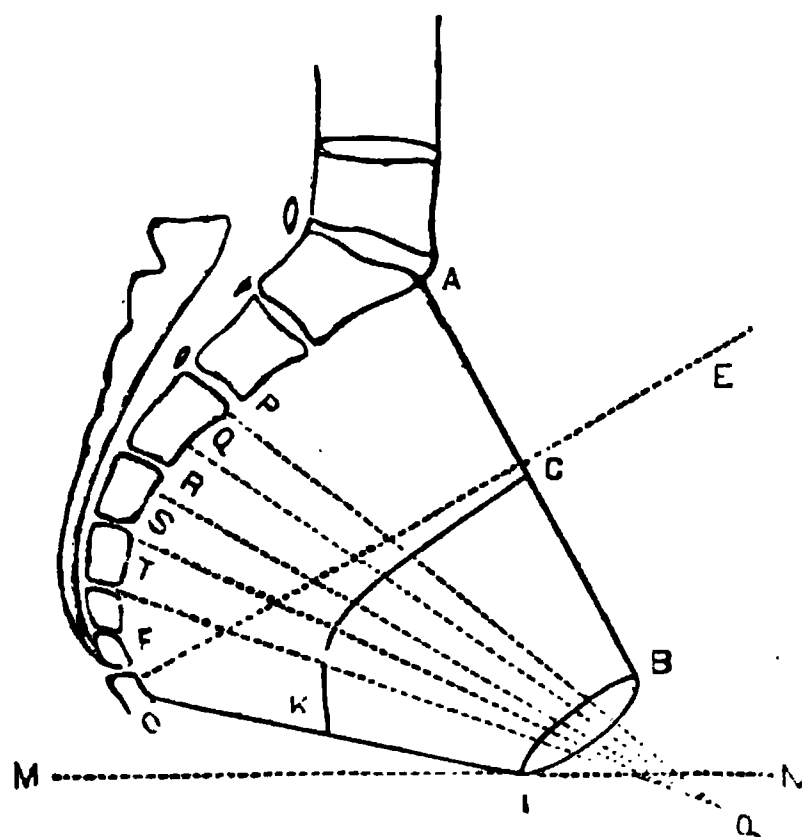
An imaginary line extending from the lower edge of the symphysis pubis to the coccygeal apex, will represent the direction of the plane of the inferior strait (C E, Fig. 5), and a line passing through the center of this plane, at right angles or perpendicular to it, will give the direction of the axis of the inferior straits (F G, Fig. 5), which extends from the center of the strait to the first sacral bone, and crosses the axis of the superior strait near the center of the pelvic cavity, forming

at their point of contact a very obtuse angle; it is parallel with the axis of the body. The direction of the axes of the two straits, should be well understood, as they determine the direction which the fetal head takes in passing through the pelvis, and which course should be followed whenever delivery has to be effected by instruments; the curved direction of the two axes through the center of the pelvis, may be considered as the true axis of the pelvis (G K, *Fig. 7*).

In consequence of the arrangement of the pelvic bones, which causes this variation in the direction of the axes of the two straits, the pelvic contents are prevented from falling downward, which might otherwise, be the result, either from their own gravity, or from the pressure of the abdominal viscera above them.

The PELVIC CAVITY or EXCAVATION, includes all that space occupied between the superior and inferior straits; it is bounded posteriorly by the sacrum, the coccyx, the sacro-iliac symphyses, and a portion of the sacro-sciatic ligaments; anteriorly, by the symphysis-pubis, pubic bones and the internal obturator fossæ; and laterally, by the two inclined acetabular planes, the sciatic openings, and the sacro-

FIG. 7.



- A B, Plane of the Superior Strait.
- I O, Plane of the Inferior Strait.
- Q', The point where these two planes would meet, if prolonged.
- M N, The Horizontal Line.
- E F, The Axis of the Superior Strait.
- G K, The Axis of the Pelvic Cavity.
- P Q R S T, Various points taken on the Sacrum to show the plane of the excavation at each point.

sacro-sciatic ligaments. The canal of this cavity possesses a curvature corresponding to the curve of the sacrum, and which gives to it a greater extent than that of the straits. The axis of this canal represents the route taken by the fetus in its expulsion through the cavity, and should be well understood by the practitioner, if he expects to meet with success in the operations which may be necessary to effect artificial delivery. The axis of the pelvis is not formed by two straight lines, nor does it, as supposed by Carus and others, represent the arc of a circle; but it has been well determined by M. Cazeaux, who observes (*Fig. 7*):

“To form an exact idea of the general disposition of the pelvic cavity, it seems best to cut that canal by a series of planes, passing

from the point Q' (the point of intersection of the planes of the superior and inferior straits), to the points P Q R S T, of the anterior face of the sacrum. Each one of these planes will determine the opening of the pelvic cavity at that point. Now, to determine with precision the direction of the general axis of the excavation, it will be necessary to erect a perpendicular to the geometrical center of each one of these sections, and to draw a line (G K) along the extremities of the perpendiculars. This line (G K) is curved, and is called the general axis of the pelvic cavity. It is easy to see that this line is nearly parallel with the anterior face of the sacrum, and its extremities are lost in the axes of the superior and inferior straits. This curve represents exactly the axis of the whole excavation; that is to say, the line which the fetus traverses in passing through the pelvis."

The depth of the pelvic excavation, posteriorly, along the sacrum and coccyx, is from five to six inches; laterally, three and a-half inches; anteriorly, along the os pubis, one and a-half to two inches. Its diameters are:

1. The *antero-posterior diameter*, passing from the symphysis pubis to the center of the sacrum, measures four and a-half inches, or more.

2. The *transverse diameter*, extending from the plane of one ischium, to that of the other, measures about four and a-half inches.

There is considerable difference in form and texture, between the pelvis of a female and that of a male. (*Figs. 2 and 3.*) The female pelvis is not so strong nor so thick as that of the male, and contains less osseous matter; in the male, the long diameter of the superior strait, is from before, backward, while in the female it is from side to side; in the male, the brim is more triangular; in the female, more oval. In the female the ilia are more distant; the tuberosities of the ischia are also further apart from each other, and from the coccyx, and the space between the pubes and coccyx is greater than in the male. The sacrum of the female is broader and more curved than in the male, and the superior articulations are more distant from each other, occasioning a peculiarity in her walking, apparently rendering it more difficult for her to preserve the center of gravity. The symphysis pubis is not so long in the female as in the male, and the rami of the pubes and ischia are smoother on their inner face, and have their anterior edges turned more outwardly; the obturator foramen is

more triangular in the female; and the cotyloid cavities are more widely apart.

The following dimensions of the male and female pelvis are by Meckel:

	IN THE MALE.		IN THE FEMALE.	
	Inches.	Lines.	Inches.	Lines.
"The transverse diameter of the great pelvis between the anterior-superior spinous processes of the ilia..	7	8	8	6
Distance between the cristæ of the ilia.....	8	3	9	4
Transverse diameter of the superior strait.....	4	6	5	0
Oblique diameter of the superior strait.....	4	5	4	5
Antero-posterior diameter of the superior strait.....	4	0	4	4
Transverse diameter of the cavity.....	4	0	4	8
Oblique diameter of the cavity.....	5	0	5	4
Antero-posterior diameter of the cavity.....	5	0	4	8
Transverse diameter of the lower strait or outlet.....	3	0	4	5
Antero-posterior diameter of the lower strait or outlet.	3	3	4	4

"The latter may be increased to 5 inches, from the mobility of the coccyx."

The above dimensions of the straits and cavity of the female pelvis are assumed as the standard, and any considerable deviation from these measurements, may present an obstacle to the progress of delivery, and the pelvis is then said to be vitiated or malformed.

It may be proper to make a brief reference to some of the vessels and soft parts which cover the pelvis, especially those which occupy its cavity. In the greater or false pelvis, we find anteriorly, the muscles and the anterior parieties of the abdomen, which assist in completing this basin; laterally, the iliac fossæ are filled with the internal iliac muscles; and posteriorly, are the psoas major and minor muscles, which pass downward along and on the sides of the lumbar column, and along the pelvic brim, to be inserted into the trochanter minor. These muscles, in connection with the iliac veins and arteries, are so arranged as to contract the size of the transverse diameter of the superior strait, to even an inch less than its true length, thus apparently presenting its oblique diameter as the largest; but these muscles are capable of great compression, especially when they are completely relaxed by flexing the thighs upon the pelvis, and hence in the majority of cases, they present but little obstacle to the passage of the fetus.

The pelvic excavation is lined by fascia, which assist in diminishing its diameters; it is also lessened posteriorly, by the sacral plexuses of nerves, the pyriform muscles, the hypogastric blood-vessels, and the

rectum; anteriorly, by the bladder, the obturator nerves and vessels, and the internal obturator muscles; and in its vertical diameter, by the floor of the pelvis or perineum, which is a muscular membranous plane closing the pelvis inferiorly, acting in antagonism to the diaphragm and abdominal muscles, and on whose median line are the urinary, generative, and fecal or anal orifices. Inclosed within these soft parts are the vagina and uterus. The muscles of the perineum are: the *sphincter ani*, surrounding the lower part of the rectum, and which arises from the coccyx, and is attached to the center of the perineum; the *sphincter* or *constrictor vaginae*, which arises from the body of the clitoris, and is attached to the center of the perineum; it is about fifteen lines wide, and surrounds the anterior opening of the vagina, acting as a sphincter to it; the *erector clitoridis* arises from the ascending ramus of the ischium, covers the inferior face of the crus clitoridis, and is inserted into the upper part of the crus and body of the clitoris; it draws the clitoris downward and backward; and the *transversalis perinaei* arises from the fatty cellular membrane which covers the tuberosity of the os ischium, and is inserted into the perineal center; it keeps the perineum in its proper place.

CHAPTER V.

DEFORMITIES OF THE PELVIS.

ANY remarkable deviation from the standard measurements of the pelvis produces a malformation or deformity of it; yet it does not follow that every slight variation should be viewed as a deformity, but only those instances, in which it may so far depart from its normal form as to render it extremely difficult, or even impossible to deliver the full-grown fetus by the natural passage. A pelvis, the small diameter of which measures three and a-half or four inches, may, in case there be no unusual enlargement of the fetal head, admit of its safe passage at full term with but very little difficulty; below this measurement, say from three inches to three and a-half, the forceps will undoubtedly be demanded; if it be still smaller than this, the induction of premature delivery would be prudent and justifiable, and if the fetal head should be unable to pass, the perforator would be required. In cases,

however, where the measurement of the small diameter does not exceed one inch and a-half, the perforator can not be used with safety, and in these instances, the Cæsarean section is recommended as the only chance for the mother's life.

The more general causes of vitiated or malformed pelvis, are rickets and mollities ossium. Rickets is probably the most frequent cause; this is a disease common to children, especially those of a strumous diathesis, and is very seldom met with in adults. In this affection the bones become very much softened, in consequence of the deficiency of the calcareous matters natural to them, owing to their absorption or non-deposition; and in connection with the disease there is most usually an arrest of development of the bones, in which the pelvis, instead of becoming properly developed with the growth of the female, retains its infantile condition, and thus presents a permanent obstacle to delivery. From these circumstances the bones curve unnaturally in various directions, especially those upon which there is much pressure, or upon which is exerted a long-continued action of the muscles; and the pelvis in particular, which sustains the weight of the trunk, becomes more or less deformed, according to the duration and severity of the disease, and the deformity continues even after the disease has been cured. Most generally, this disease commences in the bones of the inferior extremities, and gradually extends itself to the pelvis, the spinal column, etc.

TREATMENT.—Children, affected with rachitis, will require both hygienic and therapeutic measures to overcome it. Rachitic softening of the pelvic bones in the female infant, demands the most careful and pains-taking treatment—the deformity following, results in after life in the most serious consequences. The invigoration of fresh air is one of the first essentials in the treatment of this disease. The child should be taken into the open air every day, as the weather will permit. While indoors, the child should be kept in a state of rest, in a reclining position; the apartment should be well lighted and ventilated, also dry, and on damp days a fire in an open fire-place would be advantageous. We should next advise the mother as to diet, and this is of the greatest importance. During the first year, the child should be nourished at the breast, providing the mother is in good condition. If breast milk can not be furnished, cow's milk may be used, properly diluted. After the age of weaning, the diet, recommended in the New

York hospitals, is meat soups, beef tea, peptonized beef—the diet being principally animal. The usual internal treatment consists in supplying lime-salts to the system. Prof. J. Lewis Smith, in his *Treatise on the Diseases of Infancy and Childhood*, recommends the following formula, which he claims will be found useful in most cases :

R Olei morrhuae - - fʒiv
 Aq. calcis.
 Syr. calcis lactophosphatis, aa fʒij Misce.

Of this, one teaspoonful should be given four or five times daily to an infant of one year.

Lime-water, codliver oil, the compound syrup of the phosphates, are recommended by most authors as valuable internal agents in the treatment of this disease. The formula I have quoted contains these ingredients in about the proper proportion. In moving the patient, great care should be taken to prevent deformities: the softened and yielding bones may be easily twisted or distorted. Children, and especially female children, who are disposed to rickets, should never be allowed to creep or walk at too early an age, lest pelvic deformity occur as a consequence. Before exertion of lower extremities is allowed, as standing or walking, the parts should be supported by stiffened dressings.

Mollities Ossium, or *Malacosteon*, is the usual cause of those deformities which take place during adult age. It also consists in an undue softening of the bones, owing to the absence of their salts, especially the phosphate of lime, and is usually connected with a gouty or rheumatic diathesis; sometimes it is the result of mercurial treatment. This disease is gradual in its progress, and the deformity resulting from it, may occur in women who have previously given birth to several children, and who may subsequently become so deformed in the pelvis, as to render delivery by the natural passage absolutely impossible.

The cause of the deformity, in either rickets or mollities ossium, is essentially the same; thus, the sacrum being softened by either disease, will, from the superincumbent pressure, be forced from its natural position, occasioning an increase or decrease of the pelvic diameters, at the superior strait, inferior strait, or in the pelvic cavity. Or the oblique diameter of the pelvis, or its antero-posterior diameter may be diminished, in consequence of the acetabula being driven in-

ward; these alterations may exist singly, or may be variously combined.

In cases of Mollities Ossium, the TREATMENT will be similar to that named for rickets, together with such other measures as may be indicated; however, the disease is seldom cured.

Deformities of the pelvis may arise from other causes than those to which I have just referred; thus, the very erroneous practice of forcing children to walk, by means of go-carts, baby-jumpers, and the like, may at an early age give rise to malformations which will continue irremediable through life. When children are allowed to walk voluntarily, gradually perfecting this exercise as their locomotive organs acquire energy, strength, and development, deformities rarely occur. A child carried constantly on one arm, may cause a malformation, and I am acquainted with a lady, who has a deformed pelvis, originating from carrying her mother's children during her girlhood, constantly resting them on the one hip. Carrying heavy burdens in early life, or remaining too long in one position, before the bones have acquired the necessary firmness, are very apt to cause this kind of malformation.

An old unreduced luxation of the femoral bones, caries of the bones, exostoses, the result of syphilitic or rheumatic affections, imperfectly consolidated fractures, and pelvic tumors, may contribute to deformity of the pelvis, or occasion a diminution in its capacity. Sometimes, it is impossible to determine the origin of the deformity.

Pelvic deformity is more common to the females of Europe than to those of this country—which is probably owing to the fact, that our countrywomen are better nourished, take more healthful exercise, and are not exposed to the many causes, common to Europe, which contribute to destroy health among the working and indigent classes. Many of the cases, which are met with in this country, are among females, whose early life was passed in some portion of Europe. But, there is no doubt, that as our population increases, together with an increase of poverty, factory-working, etc., these results will cease to be uncommon among us.

The various forms, given to the pelvis by the above causes, are very numerous, and must ever vary, according to the multitudinous local accidents, severity and duration of the causes, etc.; and to enter into a minute description of them, or to arrange them into distinctive classes, is almost impossible; nor, indeed, is such an attempt absolutely neces-

sary. Some of the more common deformities have, however, been classified by authors as follows: 1st. The abnormally large pelvis, or where there is an excess of dimension; 2d. The dwarfish pelvis, or where there is a diminution of dimension; 3d. The unequally contracted pelvis; and 4th. The obliquely distorted pelvis.

1st. The *abnormally large pelvis* (*pelvis equaliter justo major*), or excess of the dimensions of the pelvis. This can not properly be termed a deformity, yet its presence may give rise to many accidents, which it is the duty of the accoucheur to prevent or relieve. Females, in the unimpregnated state, in whom this condition exists, are very liable to various uterine displacements, which often prove extremely difficult to remedy. And during pregnancy, from the absence of due support to the uterus above the superior strait, this organ readily descends into the pelvic cavity, producing a sense of weight, with various painful and unpleasant symptoms; as painful or difficult micturition, constipation, obstinate tenesmus, hemorrhoids, pains, cramps, etc., the necessary result of compression of the bladder, rectum, and the blood-vessels and nerves which line the pelvis, by the enlarged and prolapsed uterus.

Again, during parturition, and especially if the female should exert herself by bearing down before the os uteri be sufficiently dilated, the uterus may be forced through the inferior strait; or, dilatation being perfected, together with frequent and energetic uterine contractions, the fetus, from the want of proper resistance, may pass easily through the pelvic straits and cavity, and suddenly present itself at the perineum, which has not yet been sufficiently distended, and lacerate it. Or, should the perineum yield without laceration, precipitate birth frequently follows, rendering the female exceedingly liable to hemorrhage, inversion, or other accidents. These inconveniences, however, may be readily obviated by a careful practitioner; the recumbent position during the first months of pregnancy and during labor, will generally overcome them.

2d. The *dwarfish pelvis* (*pelvis equaliter justo minor*), or diminution of the dimensions of the pelvis. This deformity, although not very common to this country, is occasionally met with. The pelvis retains the proper form and dimensions externally, yet its internal cavities are very much diminished in extent, varying from a quarter of an inch to an inch, in each of the diameters. This kind of deformity is not connected with rickets nor malacosteon; nor can it be attributed to arrest of development, as the pelvis is usually well formed, and

bears no resemblance to the undeveloped pelvis of the child; its causes are not well understood.

The difficulty in giving birth to a child, depends entirely upon the degree of deviation of the pelvic dimensions from the standard size and the proportions existing between the diameters of the fetal head and the pelvis; yet a pelvis smaller than the average size, may occasion no other difficulty than a tedious, disagreeable, painful, and perhaps exhausting labor.

The diagnosis of this deformity is always difficult to correct determine, unless we have had its existence indicated by a previous labor, and in cases where we suspect its presence from the size of the patient, a certainty may be acquired by an examination. All the diameters of the pelvis are equally contracted in the dwarfish pelvis; hence it has been termed "the equally contracted pelvis," and as no favorable changes can be effected in consequence of the impossibility of bringing the long diameter of the head to correspond with the long and uncontracted diameter of the pelvis, as in the unequally contracted pelvis, very great obstacles to delivery are presented, and most labors result fatally to both mother and child.

3d. The *unequally contracted pelvis*, or partially deformed pelvis, in which there is a great alteration or disproportion between the various parts, so that during labor the female is subject to much suffering, and even death, and the practitioner frequently becomes embarrassed. This deformity may exist in the greater pelvis, the lesser pelvis, the superior strait, the inferior strait, or in two or more of these united.

FIG. 8.



ELONGATION OF THE ANTERO-POSTERIOR DIAMETER
OF THE SUPERIOR STRAIT.

The most usual deformities in the greater pelvis are an exaggeration of the curvature of the lumbar column, presenting a deviation or projection of its anterior surface; or the wings of the ilia, or the iliac fossae may be turned too much outwardly. These deformities do not materially

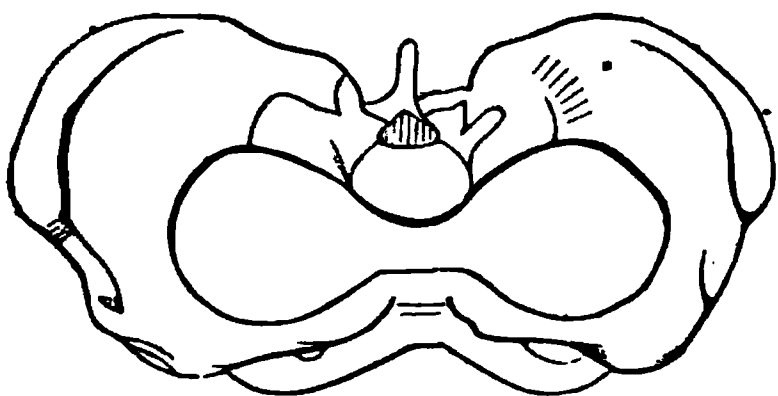
affect either pregnancy or parturition, although when excessive, they undoubtedly influence the presentations of the fetus, and sometimes

occasion a permanent obliquity of the uterus, which may prevent the natural expulsion of the child. (*Figs. 8 and 9.*)

The lesser pelvis, or pelvic cavity, may be deformed by a deficiency or excess of one or more of its diameters, and which must, consequently, influence, in a greater or less degree, the diameters of the superior and inferior straits—more frequently those of the superior strait.

The antero-posterior diameter of the superior strait may be affected

FIG. 9.



DIMINUTION OF THE ANTERO-POSTERIOR DIAMETER OF THE SUPERIOR STRAIT, AND ELONGATION OF THE TRANSVERSE DIAMETER.

by the advancement of the promontory of the sacrum toward the center of the strait, in which case we usually find an excessive curvature of the sacrum, which is sometimes so great, that its apex looks up toward the pubic arch, interfering with the antero-posterior diameter of the inferior strait; or, while the base of the sacrum diminishes the antero-posterior diameter of the su-

perior strait, in consequence of its abnormal projection, its apex may be thrown backward, and thus increase the diameter of the inferior strait. Sometimes the sacrum may be unchanged, but the pubes will be found retreating toward the sacrum, diminishing the antero-posterior diameter of the brim; at other times, both the change in the sacrum and pubes may exist simultaneously.

The transverse diameter of the superior strait may be diminished in consequence of one side of the pelvis being much narrowed, or the horizontal rami of the pubes may approximate toward each other, becoming nearly parallel, and with this there may likewise exist an approach of the iliac bones. The forward projection of the pubes caused by this deformity, increases the antero-posterior diameter of the brim. A diminution of the transverse diameter of the brim, is seldom accompanied by an increase in that of the inferior strait; although it may be present where the contraction is the result of an upward and backward dislocation of the femur, drawing the ischiatic tuberosities and pubic rami more distantly apart. The transverse diameters of both straits may be lessened by improper pressure upon the pelvis at a time when, in consequence of disease, the bones are softened.

The oblique diameter of the superior strait may be decreased by

one side of the pubes projecting inwardly, while the other projects outwardly, or the iliac bones may turn inwardly. If, in the first deformity, the long diameter of the fetal head presents in the direction of the great oblique diameter of the brim, and the transverse occupies the diminished diameter, labor may terminate safely without artificial assistance.

The superior strait may not be at all changed, while the inferior strait is much diminished; thus, the antero-posterior diameter of the inferior strait may be lessened by the apex of the sacrum turning within and upward toward the pubic arch; or the coccyx may project forward too much.

The transverse diameter of the inferior strait may be contracted in consequence of the approach of the ischiatic tuberosities toward each other, as well as of the sides of the pubic arch, which will render it absolutely impossible for the head of the child to pass, or even the hand of the accoucheur. This deformity is the most to be dreaded; the head readily passes through the brim and pelvic cavity, and becomes arrested only at the outlet, and the practitioner, after delaying for a length of time, in hope of its expulsion, is finally obliged to employ the forceps or perforator.

The oblique diameters of the inferior strait may be changed by the maldirection of the ischio-pubic branches.

These malconformations of the two straits may exist singly, and sometimes in combination, but in opposite directions; thus, if one strait be contracted, the other will be enlarged. The consequences which must arise from these various changes, will be evident to the student who compares the diameters of the child's head with those of the bony passages through which it must pass.

The pelvic cavity may be deformed, 1st, by a turning backward of the pubes; 2d, by the abnormal length of the symphysis pubis, which retards delivery by preventing the head from engaging in the arch of the pubes; 3d, by the too great or small curvature of the sacrum; 4th, by exostosis, and fibro-cartilaginous morbid productions. Various other forms, than those referred to, may be assumed by the pelvis, which, however, can not be satisfactorily classified, as they must ever vary, according to circumstances.

4th. *The obliquely distorted pelvis.* (Fig. 10.) This deformity is usually dependent upon an arrest of development of one or the other side of the sacrum; more generally the right side, and which occasionally extends to, and includes the ilium. Nægèle was the first writer who seems to have noticed this deformity, and of whose re-

marks M. Cazeaux has given us the following in his work on Midwifery, translated edition, p. 434:

“The peculiar characteristics of these deformed pelvises are as follows:

“1st. Complete ankylosis of one of the sacro-iliac symphyses, or partial fusion of the sacrum and one of the iliac bones.

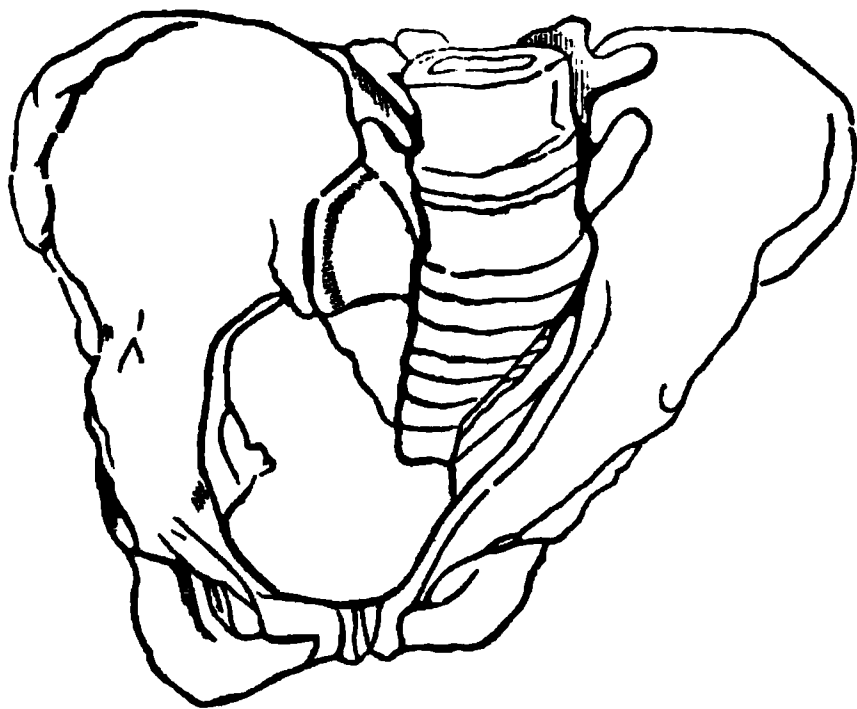
“2d. Arrest of development, or defective development of the lateral half of the sacrum, and defect in the amplitude of the anterior sacral foramina of the ankylosed portion.

“3d. On the same side, diminished length of the ilium, with diminution in the extent of the sciatic notches of this bone; that is to say, the distance from the anterior-superior spinal process of the ilium, to its posterior-superior spinous process, as also the length of a line drawn from a point at the pelvic inlet, corresponding with the sacro-iliac junction, if it existed, along the linea innominata, and the linea ilio-pectinea to the symphysis pubis, are shorter than (the same distances) on the other side. But farther upon the ankylosed bone, the part corresponding with the articular surface, which is continuous without interruption, with the sacrum, is not so high, and descends to a shorter distance than it does on the opposite side, and than it would do in a bone normally formed; or to express myself more clearly, if on the ankylosed side we suppose the ilium and sacrum separated, or reunited only by the interposition of a fibro-cartilaginous disk, such as exists in the normal joint, the articular surface or the reunion of the two bones would be found less long, and would descend less low than it would on the non-ankylosed side, or upon the pelvis normally constituted.

“4th. The sacrum seems to be pushed toward the ankylosed side and it is toward that side that its anterior face is more or less turned, while the symphysis pubis is pressed toward the opposite side, a disposition which prevents the symphysis pubis from being directly opposite the promontory of the sacrum, and gives it an oblique direction.

“5th. On the ankylosed side, as much of the internal surface of the ilium as concurs to the formation of the pelvic excavation is flattened,

FIG. 10.



OBLIQUELY DISTORTED PELVIS,

In which the antero-posterior diameter traverses from the promontory of the sacrum to the left acetabulum; the left oblique diameter is also lessened, while the right is normal.

and where considerable vitiating exists, it is almost entirely plane, so that a line drawn from the middle or even from the posterior end of the linea innominata, along the body and the transverse branches of the pubis to its symphysis, will be nearly straight. We have never seen at the lateral half of the anterior wall of the pelvis, of which we now speak, any inclination inward, nor have we ever especially noticed that sort of fracture of the horizontal branch of the pubis, which is observed in pelvises deformed from the effects of malacosteon in adults.

“6th. The other lateral half of the pelvis, that is to say, the one in which there exists a sacro-iliac synchondrosis, also differs from the normal condition. At first sight, in examining the pelvis under consideration, and especially where the obliquity is considerable, it is easy to induce oneself to believe in the normal conformation of the non-anchylosed half; but this opinion is not correct; thus, let us suppose two pelvises equally contracted, with this difference only, that in one the *left* sacro-iliac symphysis is anchylosed, in the other, the anchylosis is on the right side; let a section of each be made so as to pass through the middle of the sacrum and the symphysis pubis—if now we undertake to fit the right half of the first pelvis to the left half of the second, so that the cut surfaces shall cover each other, we will discover that the pubic bones are separated by a distance of from eight to twelve lines. Thus, the lateral half of the pelvis, which is free from anchylosis, participates not only in the abnormal situation and direction of the bones, but also in their irregular form, in such a way that in measuring this half, a line drawn from the center of the promontory of the sacrum, along the linea innominata, and pectinea, to the symphysis pubis, would be at its posterior half more curved, and at its anterior half less curved than in a pelvis well formed.

“7th. It follows from this, that the pelvis is obliquely contracted, that is to say, in a direction which would intersect a line passing from the anchylosed joint to the cotyloid cavity of the opposite side, while the extent of the last-mentioned line is not diminished but may be increased where the obliquity is very marked. In consequence of this, the shape of the superior strait (that is to say, an imaginary surface passing along the linea innominata and the linea pectinea over the sacrum), and the shape of the middle of the excavation (situated midway between the superior and inferior straits, called the *apertura pelvis media*), would both resemble, properly speaking, an oblique oval when examined in front—the transverse or small diameter of which would be represented by the contracted oblique diameter of the pelvis, while its great or longitudinal diameter would correspond to the other oblique

diameter. On this account we may, as far as the form is concerned, term this variety of pelvic deformity the *obliquely oval pelvis*.

"That the distance from the sacral promontory to the point corresponding to the one or the other cotyloid cavity (the distance sacro-cotyloid), as well as the distance from the obtuse point of the sacrum to the spine of the ischium on either side, is less on the side where the anchylosis exists.

"The distance from the tuberosity of the ischium on the side of the anchylosis to the posterior-superior spinous process of the ilium of the opposite side, as well as the distance between the spinous process of the last lumbar vertebra, and the anterior-superior spinous process of the ilium on the side of the anchylosis, are smaller than the same measurements on the opposite side.

"The distance from the inferior edge of the symphysis pubis to the posterior and superior spinous process of the ilium, when the anchylosis exists is greater than that extending from the same point of the symphysis pubis to the posterior-superior spinous process, of the opposite side.

"The walls of the pelvic excavation converge, in a certain oblique manner, from above downward, and the pubic arch is more or less contracted, so as to give it a resemblance to the male pelvis. These two conditions, as well as the contraction of the sciatic notch, the diminution of the distance existing between the spines of the ischia, and the one-sided and defective development of the sacrum, bear a direct proportion with the degree of obliquity.

"Finally, on the flattened side, the cotyloid cavity is placed more directly in front than is observable in the normally-formed pelvis, while on the opposite side, it looks almost directly outward, in such a way that when examining the pelvis in front the eye rests directly upon the cotyloid cavity of the flattened side, while the edge of the one on the other side can only be seen, or at least very little of its cavity.

"In order to give to those who never have seen a pelvis of this kind as accurate an idea as possible, we will remark that when first seen they give us the impression that the deformity has been occasioned by a pressure acting from above downward, and from without to within, in an oblique direction upon one of the lateral halves of the anterior pelvic walls, and upon one of the cotyloid cavities, while, at the same time, the other half seems to have been compressed on its posterior portion from without inward.

"Another peculiarity of this variety of deformed pelvis is, that they

differ from each other only in the degree of their obliquity, and at the point where the sacrum is soldered to the ilium, while in every other respect (that is to say, in reference to the principal peculiarities of the deformity), they resemble each other as much as two eggs. It is on this point that a skillful person, not knowing this peculiarity, would be disposed to take two different specimens presented to his inspection for the same, and it would be difficult to convince him of his error.

“The condition of the bones of the pelvis (exclusive of the variations already mentioned), as it regards their strength, their volume, their texture, their color, etc., is exactly similar to that of healthy bones, such as are observed in young persons exempt from all deformity. It is for this reason that we find on these bones none of the signs, either as it regards form, etc., which are met with, as the consequence of rickets or malacosteon of adults. If we divest our mind of the existing deformities, the pelvis which we have seen, would seem to resemble, in general, the healthy pelvis. The majority of them belong to the medium-sized pelvis, while the others are either under or over the average size. In no case that we have specially noticed, have we discovered the least sign of the existence of rickets; in none have there appeared any of the phenomena, or accidents, or morbid modifications, which usually precede or follow the English disease, or the mollities ossium after puberty. Nowhere have we been able to establish the injurious effects of external causes, such as falls, blows, etc., and never has there existed any antecedent pain. It has not been proved, in any of the cases which we have specially examined, that there existed any lameness. In one case only, we thought in seeing the person walk we observed a slight limp, but other *connoisseurs* present at the examination, did not observe it, and the parents, and all the family of the person in question, assured us positively, that they never remarked any lameness.

“In the pelvis of this kind, with the lumbar vertebræ attached, the vertebral column was strait in the lumbar region; in other cases, it inclined to the side exempt from ankylosis. In all the pelves of our collection, provided with lumbar vertebræ, the anterior face of the bodies of the vertebræ was more or less turned toward the ankylosed side.”

The ankylosis of the sacro-iliac symphysis, above-named, as a peculiarity of this deformity, is usually so perfect, that the articulation can not be discovered; and the two bones appear as one, without any perceptible line of demarkation between them.

CHAPTER VI.

INDICATIONS OF MALCONFORMATION OF THE PELVIS.

UNDOUBTEDLY, the greatest earthly happiness consists in a domestic life, where harmony and co-operation can be maintained; and there is nothing so truly calculated to embitter it, and render it a source of constant wretchedness to husband, wife, and relatives, as a knowledge of the existence of pelvic malconformation in the wife, rendering her incapable of giving birth to a full-grown fetus; and to determine such conformation and capability, in the otherwise marriageable female, physicians are often consulted. It is, therefore, highly desirable that every practitioner should be thoroughly acquainted with all the symptoms and indications necessary to determine the *presence* as well as the *extent* of a pelvic deformity, for should he decide incorrectly, from lack of proper information, and thus cause the parties to engage in a contract for life, the responsibility of the death of the female, accruing therefrom, would rest solely upon him. Or, as is sometimes the case, the pregnant woman may require his knowledge to correctly ascertain the extent of malformation, that a course may be pursued to preserve both the parent and child, if possible—at all events the mother—also, whether there would be safety in allowing gestation to continue its full term, or in the induction of premature delivery.

Various causes may give rise to a suspicion of pelvic deformity, as the pre-existence of rickets, fractures, unusual shortness of the inferior extremities, or an inequality in their length, as well as an inequality in the height of the hips, etc.; a short female with long arms, when compared with the rest of the body, projecting chin, and short, crooked legs, has also been named among those disposed to pelvic malformation.

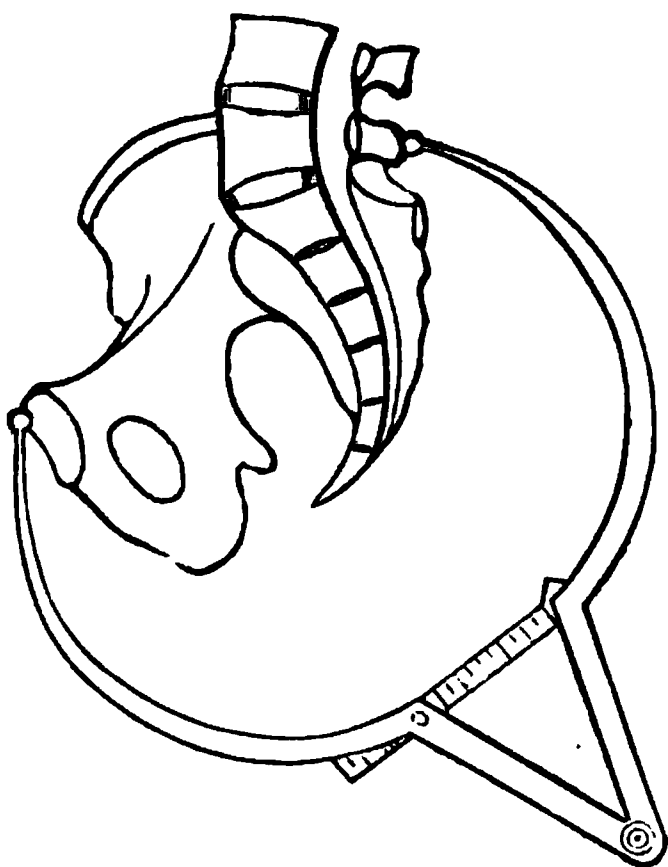
In the investigation of this matter, the physician should make himself as thoroughly acquainted as possible with the previous history of the patient, even from her infancy; the presence of scrofulous symptoms, or rickets, or any lameness or difficulty in walking at any antecedent period, any fall upon the sacrum, or carrying heavy weights, must be carefully inquired into; and if there should be found any spinal curvature, or shortening, or incurvation of the inferior extremities, the age at which these changes occurred should be noticed; though it must be remembered, that pelvic deformity is by no means

a constant accompaniment of either of these last named conditions. In sixty-nine cases of spinal deformity, reported by M. Bouvier, there were but twelve cases where pelvic deformity was present. Should there be present an inequality in the length of the inferior extremities, it must be ascertained whether this arises from dislocations, or improperly united fractures independent of rickets, or whether it be owing to rickets, or mollities ossium.

The above indications, however, though they may occasion a suspicion of some existing deformity, are, of themselves, insufficient to give a precise idea of its extent or character; yet when they are present, they afford competent grounds for further and more accurate examination. For this purpose there are various methods recognized; as the measurement of the pelvis by instruments designed therefor, termed *callipers*, or *pelvimeters*; or by the employment of the hand. The first is termed *instrumental pelvimetry*, the latter, *manual pelvimetry*; and by the term *pelvimetry* is understood, a process having for its aim the measurement of the various diameters and extent of the pelvis.

The principal object for which pelvimeters have been used, is to ascertain the capacity of the superior strait, which is the fetal entrance to the pelvis, and more particularly, the extent of its antero-posterior diameter, though the dimensions of other parts may likewise be deter-

FIG. 11.



BAUDELLOCQUE'S PELVIMETER.

mined by some of them. The pelvimeters most usually employed, are Cou-touly's, Stark's, Baudelocque's, Mad. Boivin's, Simcon's and Stein's; some of which are for *external* pelvic measurement, and the others for *internal*.

Baudelocque's pelvimeter is for external examination, and is most commonly preferred to any others yet invented for that purpose. It (*Figure 11*) consists of two movable metallic branches or arms, curved externally in a semicircular form, and of sufficient concavity to embrace the hips, or antero-posterior diameter of the pelvis. One extremity of these arms is straightened for the distance of about five inches, and, at its superior portion, is attached to its fellow by a hinge, while the other, or free extremity terminates in a knob, or button. At the inferior portion of the

straightened arms of the compass, commences its curvature, and at this point a graduated scale is attached, which moves in a groove, and indicates the degree of separation of the free extremities. The instrument should always be applied to the naked body. In an examination, one of the knobs must be placed on the first spinous process of the sacrum, which will be found a short distance below the hollow of the loins, and the other must be placed on the symphysis pubis, or in the separation of the labia majora at the most elevated point of the anterior commissure of the vulva; and in effecting this, the skin must be carefully drawn upward, so as to reach, as nearly as possible, the upper part of the symphysis pubis, or else an error of several lines may be made. This position of the instrument indicates the distance from the posterior edge of the spinous process of the sacrum to the anterior surface of the symphysis pubis, which, in a well-formed pelvis, will be seven inches. But, in order to determine the precise extent of the antero-posterior diameter of the superior strait, the thickness of the sacrum, two and a half inches, as well as that of the symphysis pubis, half an inch, must be subtracted from the external measurement, seven inches, and which will give four inches as the length of the diameter sought.

From the fact, however, that the knob of the posterior extremity can not always be correctly placed upon the first spinous process of the sacrum, and that there is more or less variation in the thickness of the soft parts over which the instrument is to be applied, as well as of the bones, and especially in the latter cases, where there has been an arrest of development, the measurement of the antero-posterior diameter of the superior strait, obtained by Baudelocque's pelvimeter, can not be depended upon as being definitely certain; neither can the instrument be rendered useful in the detection of other varieties of malformation, whether dependent on exostosis, projection of the sacral promontory, or other causes. And although its use is recommended in cases where minute accuracy is not required, and in those unmarried females in relation to whose pelvic dimensions the physician is consulted, in each of which instances its employment may aid us in our diagnosis; yet a reliance solely upon its indications is, under all circumstances, exceedingly imprudent and hazardous.

These objections to Baudelocque's pelvimeter, occasioned the invention of *Coutouly's pelvimeter*, which, unlike the former, is designed for the internal measurement of the pelvis. It is composed of two straight steel arms, parallel with each other, and which slide with equal facility, the one upon the other; these terminate in two raised extremities, and

when introduced into the vagina, one of the extremities is applied against the symphysis pubis, and the other against the promontory of the sacrum; the application of which, however, is exceedingly difficult to effect with accuracy. To the horizontal branch is attached a scale, which indicates the exact amount of separation of the two extremities. The introduction of this instrument is difficult, always attended with more or less pain, and rather disgusting to female delicacy; all of which render its employment very objectionable.

The pelvimeter of Coutouly has undergone several modifications, though the same objections still remain. The improvement of this instrument, by Prof. M. Van Huevel, at Brussels, is considered superior to any other. The following description of it is given by Tucker:

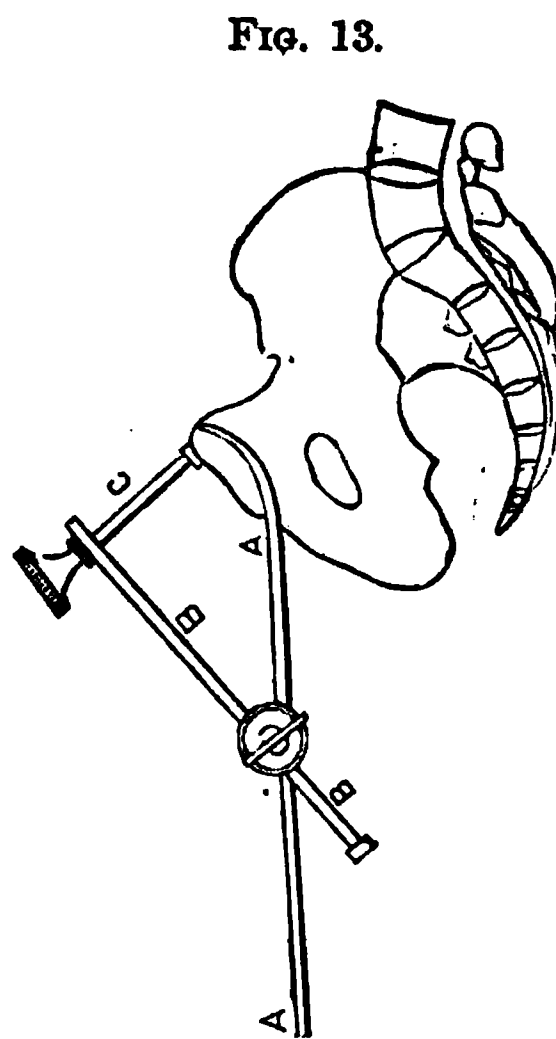
FIG. 12.

"This instrument is composed of two metallic rods, A A and B B (*Fig. 12*), united by means of a joint, so arranged as to allow the extension of the rods at pleasure, at the same time that this joint may be tightened by means of a nut-screw. The rod A A, intended to be introduced into the vagina, is curved anteriorly, and flattened at its extremity in the form of a spatula; the other rod, B B, is not so long, and is traversed at one extremity by a rod, C, movable backward or forward, by means of a screw. In applying this instrument, the female is placed upon her back, with the legs and thighs well flexed, and separated as widely as possible.

VAN HUEVEL'S PELVIMETER.

The point on the skin corresponding to the upper edge of the symphysis pubis, should be marked with a dot of ink; at the same time, a similar mark may be made to designate the position of the ilio-pectineal eminence, for the purpose of measuring the oblique, as well as the antero-posterior diameter of the superior strait. This being done, one or two fingers should be introduced into the vagina, and placed against the sacral promontory; when this has been found, the internal rod, A A, is to be inserted into the vagina, and carried along the fingers to the promontory of the sacrum, against which the broad extremity of the rod is to be placed. In this position it may be firmly held by hooking the thumb of the hand introduced into the vagina, over the hook attached to the rod A A. When this rod has been accurately

placed, the button extremity of the rod c, should be fixed upon the dot of ink, indicating the superior edge of the symphysis pubis. When the point of union between the two rods has been made firm, by tightly screwing the nut, the instrument may be withdrawn, and the distance from the extremity of the rod c to that of A A, may be ascertained. But, in order to obtain the length of the sacro-pubic diameter, we must subtract the thickness of the pubis, and to do this, it must be measured by reintroducing the instrument, as is seen in *Fig. 13*. The distance first ascertained, minus the thickness of the pubis, will give us the exact length of the antero-posterior diameter of the pelvic brim.



VAN HUEVEL'S PELVIMETER.

"The length of the oblique diameter may be ascertained in a similar manner. In this case, the extremity of the rod A A, must be placed against the sacro-iliac junction, while that of the rod c will rest on a point a little external to the iliac artery. If the sacro-iliac junction can not be reached, we may measure, instead of the oblique diameter, the distance sacro-cotyloid, which will give us every measurement of importance, since, where the oblique diameter is contracted, it is due (except in some cases of exostosis), not to compression inward of the sacro-iliac joint, but to that of the sacral promontory or the cotyloid cavity.

"This instrument may be employed also in measuring the pelvis externally, but its application in this case is too simple to require farther explanation."

The other pelvimeters, by Stein, Simeon, and Mad. Boivin, are somewhat similar in construction to those just named, and are liable to the same objections. The pelvimeter of Stark, is rather simple in its formation, but is decidedly objectionable, on account of its application requiring the introduction of the whole hand within the vagina, which would be exceedingly improper in an unmarried female; beside which, in a small or deformed pelvis, much pain and difficulty must necessarily attend its use. Prof. Lazarewitch, of Charkoff, Russia, has devised a pelvimeter which may be used for internal or external measurements, or for these two combined; it is in many respects superior to any that have yet been presented to the profession, but has not been generally received.

All artificial pelvimeters are liable to more or less inaccuracy, and in some instances are of no use at all; still we should not omit their employment in those cases which come before us for examination, as they will usually afford some aid toward forming a correct diagnosis. The hand, and, under certain circumstances, the index finger of the accoucheur, when skillfully introduced into the vagina, is undoubtedly the most certain and accurate pelvimeter we have, and can be employed with all females, whether married or not. I am aware that writers generally oppose the use of the finger in the examination of the unmarried, and would impress it upon all practitioners as a correct rule by which to be governed, more especially in this country, where pelvic deformities are rarely to be met with; but when the female has arrived at the marriageable period, and is about to enter into wedlock, yet doubts are entertained as to the perfect formation of the pelvis, and the other indications lead us strongly to suspect some defection, we should not hesitate a moment in performing a manual exploration, considering the future health, happiness, and life of the individual of too much importance to herself, her friends, and society, to be trifled away by an unwise regard to customs or opinions, which are only strictly applicable to the healthy, and those of perfect conformation.

In the manual examination, it is preferable to have the female standing erect, with her shoulders against the wall; the index finger, having been previously oiled, should then be carefully introduced into the vagina, with the end of the finger pointing upward and backward in the direction of the promontory of the sacrum. If, when the radial portion of the finger has reached the lower edge of the symphysis pubis, the sacral promontory can not be felt, we may safely determine that this diameter of the superior strait, the antero-posterior, is not deformed; but if the sacral promontory can be felt, a mark should be made upon the finger, at its point of contact with the symphysis pubis, (or the index finger of the other hand may be placed upon this part and held there), and then withdrawing it, the distance between the mark and extremity of the finger will give us the exact measurement of this diameter, if we deduct from it six lines, for the thickness of the symphysis pubis, and two or three lines for the obliquity of the measurement.

But this is only useful where the pelvis is much distorted, or where the antero-posterior diameter of the brim is less than three inches. Other methods have been advised where greater accuracy is required, such as the introduction of the whole left hand within the vagina, to such a distance that the external edge of the little finger may be placed

against the inner surface of the symphysis pubis, and the first finger against the promontory of the sacrum. As the

FIG. 14.

hand must be opened, after having entered within the vagina, the practitioner can ascertain both the antero-posterior and transverse diameters, by knowing whether the whole width of the digital extremities of the hand can be introduced into the space under investigation—whether he must spread his fingers to touch the extreme limits of the diameters—or, whether he can only introduce two or three fingers. In the first instance, the diameters will be equal to the width of the digital extremities of the hand; in the second, they will be more than three inches, and perhaps four; and in the latter, the measurement will be from one and a half to three inches, according to the measure of the fingers introduced. (Fig. 14.)

MANUAL PELVIMETRY.

The distances between the ischiatic tuberosities can be ascertained by moving the finger from side to side, or by means of a pair of compasses applied externally. The finger can likewise measure the antero-posterior diameter of the inferior strait, by applying its radial portion to the symphysis pubis, with the extremity pointing toward the apex of the coccyx. The transverse and oblique diameters of the superior strait may also be ascertained, sufficiently accurate for all practical purposes, by carefully examining the circumference of the brim with the finger, in cases where this is practicable.

FIG. 15.

The length of the symphysis pubis, the curve of the sacrum, the projection of the spine of the ischium, the shape of the straits, the condition of the lateral parietes of the cavity, and the presence of any tumor within the pelvis, can always be decided by the finger much better than by any instrument. And in cases where the fetal head does not advance during labor, the finger can readily determine the space existing between the circumference of the head and that of the pelvis, and thus instruct us whether the pelvis be sufficiently proportioned or not.

In cases where the child's head is somewhat

MANUAL PELVIMETRY.

protruded into the pelvis, even when the brim is contracted, and the hand can not in consequence be carried up to make an accurate examination, Ramsbotham recommends two fingers of the left hand to be introduced within the vagina, the extremity of the first finger being placed exactly behind and against the symphysis pubis, and the tip of the second against the sacral promontory. If the examiner will then carefully withdraw the fingers, keeping them steady, the distance between their extremities may be measured on a scale of inches, or otherwise, and thus give the exact dimensions of the antero-posterior diameter. (*Fig. 15.*)

CHAPTER VII.

THE FETUS, ITS DIVISIONS AND DIMENSIONS.

IN order to understand the mechanism of labor, beside having a knowledge of the pelvis and its divisions, it is likewise necessary to become well acquainted with the dimensions of the various parts of the fetus, especially those which, from increase of size, may render it difficult or even impossible for labor to progress. Accoucheurs generally divide the fetus into three distinct parts, namely: the *head*, the *trunk*, the *extremities*; some, however, in consequence of the peculiar manner in which it is curved upon itself when within the uterine cavity, object to this division, and prefer another, comprising, 1, the *cephalic extremity*, or *head*; 2, the *pelvic extremity*, including the pelvis and the inferior extremities; and 3, the *torso*, or *trunk*, having reference to the parts between the head and upper pelvis. But the first arrangement is sufficient for all practical purposes.

The head is of an oval shape, and is the largest and least reducible part of the fetus, and a familiarity with its obstetric divisions and dimensions is highly necessary for the successful accoucheur. The bones of the fetal cranium are the same in number as in the adult head, but they are soft, and are not united by firm sutures as in the adult; their imperfect ossification gives rise to membranous spaces between them of greater or lesser extent, called *commissures* or *sutures*, from the Latin word *suo*, to sew, and which are often of much benefit to the safety of the child during its passage through the pelvic canal, inasmuch as in every delivery they admit a certain degree of com-

pression or reduction of the head, and even a riding of the bones over each other. They also serve as indications by means of which the position of the head in the pelvis may be correctly ascertained. There are several of these sutures, but those which are the most important are three in number—the others are of no practical utility in an obstetrical point of view.

1st. The *sagittal* or *median* suture or commissure, is situated between the two frontal and the two parietal bones, and extends from the root of the nose to the superior angle of the occipital bone, dividing the anterior and superior portion of the cranium into two equal parts; anteriorly, it is crossed at right angles by the coronal suture, and terminates posteriorly at the lambdoidal suture. Occasionally, but very rarely, instances are found where this suture extends throughout the occipital bone, dividing it into two parts.

2d. The *coronal* suture, sometimes called the *transverse, anterior, or fronto-parietal*, crosses the sagittal suture at right angles, separating the frontal from the parietal bones, and extends from the extremity of the greater wing of the sphenoid bone of one side, to that of the opposite side.

3d. The *lambdoidal*, or *occipito-parietal* suture, separates the upper edge of the occipital bone from the posterior edges of the parietal bones; in shape it resembles the Greek capital, *lambda*.

At the points of intersection and junction of these commissures are membranous spaces or openings, occasioned by the incompleteness of the ossification of the angles of the bones. There are six of these spaces in the fetal head, of which a knowledge of but two is all that is required for practical purposes; they are technically termed *fontanelles* from *fons*, a fountain; they have also been called *bregmas*, from a Greek word signifying "to sprinkle," each name originating from an ancient idea that a moisture passed from the brain through these membranous spaces.

The *anterior fontanelle*, also called the *bregmatic*, or *frontal*, is the opening situated at the intersection of the coronal and sagittal commissures; it is of a quadrangular or diamond-shape, and may be distinguished by the four bony angles, the edges of which are soft and smooth, being almost always tipped with cartilage. The opening is of considerable size, which, however, varies in different heads, and the finger can readily detect it by its soft, smooth, and yielding character.

The *posterior* or *occipital fontanelle*, is situated at the center or angle of the lambdoidal commissures at its point of junction with the pos-

terior extremity of the sagittal commissure. In the immature fetus it may be felt distinctly, but in the full-developed infant it consists of merely a kind of triangle formed by the meeting of the two commissures, and is frequently wanting. This fontanelle may be distinguished by its triangular shape; its narrowness, being much smaller than the anterior fontanelle; having but three bony angles; and in consequence of the more complete ossification of the edges of the bones, they impart to the finger, on pressure, a hard serrated sensation, which is never possessed by the edges of the anterior fontanelle, and which, therefore, will enable the practitioner to distinguish the one fontanelle from the other. In many instances the posterior fontanelle is so small that it can only be distinguished by the three commissure lines that radiate from a common center.

It has been previously remarked, that occasionally the sagittal commissure continues throughout the occipital bone, dividing it into two parts, and in instances where this occurs, four bony angles will be perceived by the finger. The practitioner, however, can not err in this, if he will recollect that the posterior fontanelle is always smaller, and its edges rougher and harder than the anterior, and that on the slightest compression of the head, the occipital bone always glides under the ossa parietalia. The anterior fontanelle is invariably larger than the posterior, no matter how well marked this last may be.

A thorough knowledge of the sutures and fontanelles is absolutely required in the practice of midwifery—for it is from them that the position of the head within the pelvis is ascertained with certainty; and in cases where interference is demanded, from a too early departure of the head from its proper or flexed position, or from some other cause, the educated accoucheur can at once render the necessary assistance to bring the labor to a safe and prosperous termination. But if he have neglected to inform himself on these points, his patient may be subjected to much unnecessary suffering, and, perhaps, from lack of timely aid, the death of both mother and child may ultimately ensue. Hence, a perfect acquaintance with these peculiar marks can not be too strongly impressed on the mind of the student. It is from these alone, that the situation of the head when in the pelvis can be correctly ascertained, and never by an ear, nose, or other part of the head.

There are four principal DIAMETERS belonging to the fetal head, viz.:

1. The *large, oblique, or occipito-mental* diameter (A B, *Fig. 16*),

extending from the vertex or posterior fontanelle to the symphysis of the chin; its measurement is from five to five and a half inches. It is important to recollect this diameter, for if it enters the cavity with either extremity descending, it can not be reversed, from want of space, but must either be allowed to escape as it presents, or be returned above the superior strait to effect a change. This diameter may be safely elongated by compression of the cranium with the forceps or otherwise, to the extent of six or ten lines, so that its whole measurement may be six or seven inches.

2. The *longitudinal, horizontal, antero-posterior* or *occipito-frontal* diameter (D E, Fig. 16), extends from the center of the forehead to the occipital protuberance; its measurement is from four to four and three-quarter inches.

3. The *perpendicular, vertical, occipito-bregmatic* or *trachelo-bregmatic* diameter (G I, Fig. 16), extends perpendicularly from the most elevated point of the vertex, or top of the head to the anterior portion of the great occipital foramen; its measurement is from three and a half to three and three-quarter inches.

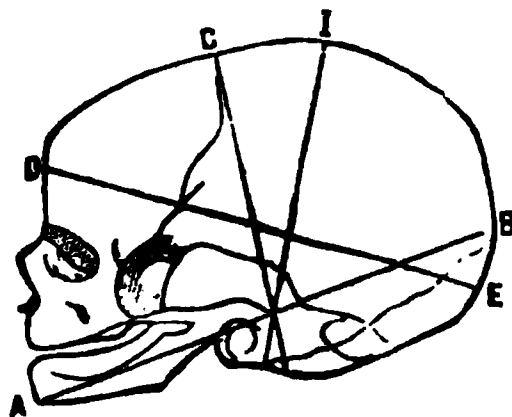
4. The *small, transverse* or *bi-parietal* diameter (A B, Fig. 17), extends from the center of one parietal protuberance to that of the other; its measurement is from three and a half to nearly four inches. This diameter may, by compression of the cranium with the forceps or otherwise, be diminished one-third or even three-fourths of an inch, without any injury to the child.

In addition to these measurements of the fetal head, with which the student must become familiar, authors have given several others, a knowledge of which, however, is not necessarily important in practice; they are:

1. The *cervico-bregmatic* diameter (C H, Fig. 16), which extends from the back part of the neck to the center of the anterior fontanelle; it measures from three and a half to three and three-quarter inches.

2. The *fronto-mental* or *facial* diameter (A D, Fig. 16), extends from the symphysis of the chin, to the center of the forehead; it measures from three to four inches.

FIG. 16.



DIAMETERS OF THE FETAL HEAD.

- A B. Occipito-mental.
- D E. Occipito-frontal.
- C H. Cervico-bregmatic.
- I G. Trachelo-bregmatic, or vertical
- A D. Fronto-mental, or facial.

3. The *post trachelo-frontal* diameter, which extends from a point midway between the occipital protuberance and the occipital foramen, to the center of the frontal bone; it measures from four to four and three-quarter inches.

4. The *præ-trachelo occipital* diameter, extends from the hyoid bone to the posterior fontanelle; it measures from three and a half to four inches.

5. The *bi-temporal* diameter (C D, *Fig. 17*), extends from the root of the zygomatic process on one side to the same point opposite; it measures from two and three-quarters to three inches.

6. The *sub-occipito bregmatic* diameter, extends from a point midway between the foramen magnum and the occipital protuberance to the anterior fontanelle; it measures three and three-quarter inches.

In order that the diameters of the fetal head may, at one glance, be compared with those of the pelvis, I present the following tables after the manner of Cazeaux:

Diameters of the pelvis, (in inches).	Antero-posterior.	Transverse.	Oblique.	Sacro-cotyloid.
Superior Strait .....	...4 to 4½.....	...5 to 5½.....	...4½ to 5 .....	...3¾ to 4½
Inferior Strait .....	...4 to 5 .....	...4 to 4½.....	...4 to 4½.....	.....
Excavation.....	...4½ to 5½.....	4½ to 4¾.....	...4¾ .....	.....

DIAMETERS OF THE FETAL HEAD.

Longitudinal Diameters...	{	Occipito-mental	5 to 5½ inches.
		Occipito-frontal.....	4 to 4¾ “
		Sub-occipito-bregmatic.....	3¾ “
Transverse Diameters.....	{	Bi-parietal.....	3½ to 3¾ “
		Bi-temporal.....	3 “
Vertical Diameters.....	{	Trachelo-bregmatic	3½ to 3¾ “
		Fronto-mental.....	3 to 4 “

A comparison of the diameters of the fetus with those of the pelvis, will be found of much utility, enabling the practitioner more readily to effect a correspondence between the large diameters of the head and the long diameters or axes of the pelvis, in all cases where such a change may be required. From an investigation of these measurements, it will be seen that at full term, the fetus, to be safely and readily expelled must present one end of its long diameter (A or B, *Fig. 16*); and also, that if its occipito-mental diameter is parallel with the

plane of the inferior strait, delivery will be impossible; either the chin or the occiput must descend first. It will likewise be observed, that the most favorable position for the expulsion of the fetal head, is to have it strongly flexed upon the body, so that its largest diameter, the occipito-mental, shall correspond to the long diameters or axes respectively of the straits and cavity, while its sub-occipito-bregmatic diameter, shall be parallel to the plane of the straits, and the occiput shall, during its passage, correspond to one extremity of an oblique diameter, until the rotation ensues which places the presenting extremity under the arch of the pubis.

Each of the diameters of the fetal head have a circumference assigned to them, the largest of which is the occipito-mental circumference, and which with the occipito frontal or horizontal circumference, are more important than the others, because during labor they successively come into relation with the pelvic parietes. The fronto-mental circumference passes over the chin, cheeks, and forehead, and is consequently termed by several writers, the facial circumference. The remaining circumferences are unimportant.

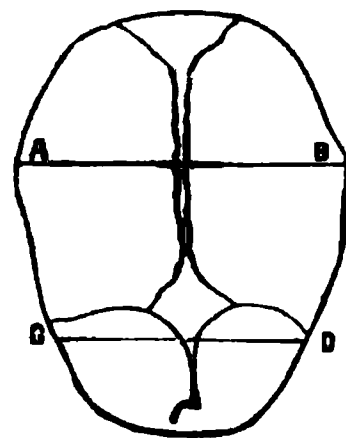
The other diameters of the fetus are:

1. The *bis-acromial* diameter, extending from one acromial process to the other; it measures four and a half inches.
2. The *dorso-sternal* diameter, extending from the vertebral column through to the sternum; it measures three and a half inches.
3. The *bis-iliac* diameter, extending from the crest of one ilium to that of the other; it measures three and three-quarter inches.
4. The *bi-trochanteric* diameter, extending from one trochanter to the other; it measures three and a half inches.

The movements which the fetal head is enabled to execute with safety, in consequence of the laxity of the articular ligaments between the head and vertebral column, must not be forgotten. In head presentations the shoulders are usually expelled so soon after the head has passed, that accidents are rarely met with; but in breech or feet presentations, or in cases of turning, in which the head may be retained for some time within the cavity from mal-position or otherwise, the careless or unskilled accoucheur may, by the employment of an ill-directed force, occasion the death of the child.

The head may be moved in four different directions, termed *flexion*,

FIG. 17.



DIAMETERS OF THE FETAL HEAD. ↓

A B. Bi-Parietal.

C D. Bi-Temporal.

extension, lateral inclination, and rotation; and the extent to which these movements may be carried, must never be lost sight of.

The *movement of flexion*, is that in which the head is thrown forward and downward, so that the chin is depressed upon the neck or upper part of the sternum, and to which extent this motion is limited. By it, the occipito-mental diameter of the head is made part of the long diameter of the fetal ovoid or ellipse. This movement of the head should never be forgotten, as when it is incomplete, or there is too early a departure of the chin from the breast, during the passage of the head through the pelvic canal, an attention to it, with the proper manipulation to restore the flexion, as hereafter described, will very much facilitate the expulsive progress of the head; but a want of care or knowledge in this matter may, in these instances, render the labor tedious, painful, and even hazardous.

The *movement of extension*, is the reverse of the former; the head is thrown backward; and the motion is limited by the occiput coming in contact with the back of the neck. This motion takes place in occipito-anterior positions of the head, in which the vertex becomes placed under the pubic arch, while the forehead, face, and chin, leaving their previous state of flexion, pass successively along the arch of the sacrum, coccyx, and perineum.

The *movement of lateral inclination* is that in which the head is thrown to one side or the other, and is limited by the side of the head, meeting with the corresponding shoulder.

The *movement of rotation* is that in which the face of the child is turned from one side to the other. All the other motions are limited in their extent by an opposing obstacle, but in this last there is none presented, and if it be carried too far the life of the child will be endangered. I have met with several cases of still-born infants, occasioned by the midwife rotating the body of the child beyond its proper limits; and instances are recorded where the body has been made to turn once and even twice, almost, if not actually twisting off the neck. It must be borne in mind that the head can not be rotated upon the neck, with safety, beyond one-quarter of a circle, or in other words, the face of the child can not be turned to the right or left beyond the corresponding shoulder; and this applies to the head when out of the pelvis, and the body within, and likewise to the body out of the pelvis and the head detained.

One thing may be adverted to here, which will be again noticed in another place, and which is, that pulling the body of the child for the purpose of extracting the head, or pulling with the forceps applied to

the head, the body not being expelled, are not only improper but exceedingly culpable. I have known a practitioner, in his endeavor to extract the head with the forceps, pull so forcibly and continuously, as to almost tear the head from the body, at the same time lacerating the soft parts of the mother in a most shocking manner.

CHAPTER VIII.

THE FEMALE ORGANS OF GENERATION.

HAVING referred to the osseous portions of the female and of the fetus, in their obstetrical relations, it becomes necessary to briefly notice the soft parts which cover them, constituting in the adult female, the organs of generation, and which are divided into *external* and *internal*. The external organs, to which the term *Pudendum* is applied, are situated on the exterior of the pelvis, where they may be noticed by the eye, and comprise, 1st. The *mons veneris*; 2d. The *vulva and its parts*; 3d. The *perineum*. The internal organs are more deeply seated, and can not be seen or studied except by dissection; they are, 1st. The *vagina*; 2d. The *uterus*; 3d. The *Fallopian tubes and ligaments*; and 4th. The *ovaries*.

The **MONS VENERIS**, or *supra-pubal eminence*, is

FIG. 18.

THE EXTERNAL FEMALE ORGANS OF GENERATION.

- A. The Mons Veneris.
- B. The Labia Externa, or Labia Pudendi.
- C. The Fourchette, or Posterior Commissure of the Vulva.
- D D. The Perineum, extending from the Posterior Commissure of the Vulva to the Anus.
- E. The Anus.
- F. The Clitoris.
- G. The Preputium Clitoridis.
- H. The Nymphæ, or Labia Interna.
- I. The Vestibulum.
- K. The Meatus Urinarius.
- L. The Hymen.

a triangular space situated at the lower part of the hypogastrium, immediately on the fore part of the pubis, in front of, and just above, the symphysis pubis. It presents a prominent rotundity, which varies according to the quantity of adipose matter deposited, and of which it is principally composed; it is more prominent in young and vigorous virgins than in mothers and aged females, and is said to be much more so in young females the natives of tropical climates. The cutis or skin which covers this part is smooth in early life, but becomes covered with short curled hair or capilli at maturity, and is supplied with numerous sebaceous follicles; a straight long hair is said to be indicative of sterility, and also of a lack of energy of the reproductive organs. Through the adipose and cellular tissue, are ramifications of some branches of the external pudic vessels and nerves, and in it are distributed some fibers of the round ligaments of the uterus.

The uses of the mons veneris during copulation are not satisfactorily ascertained, though it is said to be more elevated when the female is laboring under sexual excitement, and immediately previous to menstruation. Moreau states, that in parturition, owing to the extensibility of the skin, and laxity of the cellular tissue contained within it, it assists in augmenting the size of the vulva. This part is sometimes attacked with inflammations and abscesses which prove exceedingly painful, and may suffer from the various forms of disease common to the tissues entering into its formation.

The VULVA is the slit, or longitudinal fissure (*fissura vulvæ*, or *genital fissure*), which extends from the mons veneris superiorly, along the median line to the perineum inferiorly. The orifice of the vulva serves as an entrance to some of the internal organs; it varies in extent in different persons; is very small in infancy, small and narrow in girls, of greater width and extent in women, and during parturition distends to a size which admits of the free passage of the child through it. After copulation its size is usually double that of the vaginal orifice; and in women who have borne many children, or who have had laceration of the perineum, it most commonly remains quite large.

Along the lateral portions of the vulva are two rounded folds, or oblong eminences, or lips, which extend in a longitudinal direction from the mons veneris to the posterior part of the vulva; these are called the LABIA MAJORA, *labia externa*, or *labia pudendi*. As they proceed from before backward, they diminish in thickness, which renders them more prominent above than below; their superior ex-

tremity is adherent, the inferior being free and rounded. Externally, the labia majora are covered with the common skin, on which a few hairs may be found, and which is supplied with numerous sebaceous follicles; internally, it is covered with a beautifully fine, smooth, and sensitive mucous membrane, of a florid color in young persons, but which is lost on the approach of age. The inner, or mucous surface, is supplied with glands that secrete a fluid preventing an adhesion of these parts, as well as protecting them from the effects of friction. By their approximation, the labia majora cover and protect the internal parts from the air and external agencies; and during parturition, when the child is about to be expelled, by their elongation and almost entire disappearance, they increase the capaciousness of the vulva. They may be attacked with inflammation, abscess, hernia, serous infiltration, or other diseases, which sometimes interfere with their functional activity, or occasion various accidents.

The point of union of the labia majora, at their upper or anterior extremity, at the symphysis pubis, forms the *anterior commissure* of the vulva; and at their lower or posterior extremity they form a kind of bridle at the anterior edge of the perineum, called the FOUR-CHETTE, *frænum*, or *posterior commissure* of the vulva, which is sometimes slightly lacerated during first labors, but which occurrence causes no trouble. The posterior commissure is the most dense and resisting point of the vulva, not yielding without difficulty.

On separating the labia majora, we observe several other parts; the NYMPHÆ, *labia interna*, or *labia minora*, which are two membranous folds, located between, and running parallel with, the labia majora, and which extend from the anterior commissure to about the genital fissure; they are formed of cellular, as well as spongy tissues, covered with mucous membrane, and contain many vessels and nerves which render them highly sensitive. Their superior edge is coherent, the inferior loose; and a little below the anterior commissure of the vulva they unite, the anterior extremity passing around the clitoris so as to form a hood, or prepuce to it, while the posterior is lost in the corresponding labium pudendi. In young persons, their color is lively red, they are firm, and their surface is not corrugated, but smooth; in women who have had children they become darker and wrinkled. Females of a phlegmatic temperament, and especially those laboring under leucorrhea, have them pale and flaccid; and in brunettes they are dark, granulated, and sometimes quite long. They are furnished with a sebaceous substance, which, if allowed to accumulate in quantity, occasions a disagreeable fetor.

In early life the nymphæ are so long as to project beyond the external lips, or labia majora, which, however, usually disappears at puberty. Occasionally, the labia minora have projected so far as to produce much inconvenience, requiring an operation for their removal; and among the South Africans, especially the Bochimman women, this elongation is found in an excessive degree, extending to eight or ten inches below the margin of the labia, forming what has been named the *apron* of the Hottentots.

The uses of the nymphæ are unknown, although they are supposed to add to the voluptuousness of copulation, and to amplify the vulva during parturition, by becoming distended or effaced; this last view, however, does not agree with my own observations, as I have repeatedly ascertained their presence during the passage of the fetal head into the world.

The CLITORIS is situated at the superior and median part of the vulva, at the junction or origin of the labia minora, and just below the anterior commissure of the vulva. It is a small red projection, bearing some resemblance to the male penis, having two corpora cavernosa, which are attached by crura to the rami of the pubes and ischia, a spongy, cellular tissue, somewhat similar to the corpus spongiosum in the male, two erector muscles inserted into the above named crura rendering the organ erectile, and is surrounded with a fold of the internal mucous membrane of the labia, which forms the prepuce, or *preputium clitoridis*. It is, however, imperforate, being without a canal, or urethra. At its external termination is a round, red protuberance, which, from its shape, has received the name of *glans clitoridis*.

The clitoris is supplied with arteries and veins from several sources, and its nerves, which chiefly arise from the sacral plexus [branches of the pudic], endow it with intense erotic sensibility. Its length is variable, and when uncommonly long or hypertrophied, has sometimes occasioned doubts as to the sex of the individual. It is of no service in parturition, but is considered as the principal seat of venereal pleasure in the female; the excision of this organ in the adult female very much lessens the voluptuousness of sexual congress; and its titillation alone will give completion to the venereal orgasm, as in instances of masturbation. In infants, this organ presents an apparent excess of size, projecting beyond the vulva, and which is owing to the want of development of the proximate organs, especially of the labia majora.

The VESTIBULE is a triangular space or depression, about an inch in length, having the clitoris above, the meatus urinarius or ori-

fice of the urethra below, and the nymphæ laterally. The lower, or inferior portion of this depression, is divided by a line or raphe, which can be readily felt with the point of the finger, and which leads directly to the orifice of the urethra. It is supplied with numerous mucous glands. Immediately beneath the vestibulum may be recognized, situated on a line with the top of the pubic arch, a small bulbous projection or cushion, which incloses the orifice of the urethra. A knowledge of this arrangement will render the catheterism of the female an easy operation.

The FEMALE URETHRA is a slightly curved canal, from one to two inches in length. It is larger and more dilatable than that of the male, and passes directly beneath and behind the symphysis pubis in an oblique direction, upward and backward, having its concavity upward, on the pubic side, and its convexity downward, on the vaginal side. During labor or parturition, the urethra becomes elongated, and its direction, as well as that of its orifice, changes, so as to create difficulty in the introduction of the catheter. For instance, distension of the bladder with urine, distension of the vagina by the presenting parts, or the elevation of the uterus, may carry the urethral canal high upward, and sometimes thrust it against the pubes, so that its orifice will be brought behind the symphysis pubis; in such cases, the sound or catheter must be introduced behind and parallel to the symphysis. The urethra is lined internally with mucous membrane, the folds of which usually run longitudinally and not transversely.

The *external orifice of the urethra*, called the *meatus urinarius*, is situated below the vestibule, and immediately above the vaginal opening; it is irregularly round, and is more constricted than the upper portion of the urethral canal. A membranous swelling, or cushion, abundantly supplied with numerous follicles, surrounds it; and in ordinary cases, where the introduction of the catheter is necessary, after having found this raised cushion, which, as already stated, is at the lower part of the vestibule, directly under the symphysis pubis, the orifice will be discovered in the center of it. The point of the catheter should be directed perpendicularly to the surface of the vestibule, introduced within the orifice, then by depressing the handle, the point will turn upward behind the pubis and toward the bladder. This tubercle or caruncle of the urethra varies in its development, the orifice being sometimes very thin, merely membranous, and at others very patulous and funnel shaped.

In instances where from long-continued pressure of the child's head, or from other causes, the practitioner is unable to detect the meatus

urinarius, and it is absolutely necessary that the bladder should be evacuated to avoid its rupturing, or the probable formation of a fistulous passage between it and the vagina, it may be necessary for the practitioner to expose the parts to sight, in order to introduce the catheter; indeed, it is his duty to do so; but under ordinary circumstances the patient should never be exposed for the operation.

The urethra may be so severely pressed by the fetal head as to occasion sloughing, resulting in urethro-vaginal fistula, which is a very difficult malady to remove; and in operations with the forceps or crotchet, the practitioner should be extremely cautious not to bruise or lacerate this canal, as it is almost certain to result in permanent stillicidium of urine. The urethral mucous membrane is subject to prolapsus, tumefaction, and occasionally polypus growths.

The HYMEN, also termed the *virginal valve*, *vaginal valve*, *flos virginittis*, *claustrum virginale*, etc., is a membranous fold formed by the mucous membrane of the genital surface. It is situated about half an inch within the vulva, at the orifice of the vagina (*ostium vaginæ*), which it closes more or less perfectly, and is usually in the shape of a crescent, with its convexity downward and adhering, and its concavity upward and detached. Sometimes it is oval from right to left, or circular, with one or more openings which allow the various secretions and discharges from the vagina and uterus to pass out; occasionally, it is imperforate, preventing the egress of these discharges. Ordinarily, the hymen is quite thin and delicate, being ruptured by the slightest causes; sometimes it is soft and lax, yielding without rupturing; and instances have occurred in which it was so firm as to present an obstacle to copulation, or to embarrass the process of parturition; to remedy which, it has been found necessary to make a circular or crucial incision in it.

The uses of this membrane are not well defined, nor can they be of much consequence, since it is lost daily without injury. The presence of the hymen has long been regarded as a sign of virginity, but when we reflect that it is sometimes readily ruptured in females of undoubted chastity, even in the acts of laughing, coughing, sneezing, lifting, etc., and again that it has been found entire at the time of parturition, most convincing proof is afforded, that, as an emblem of virginity, this membrane can not be depended upon under any circumstances whatever; for its absence affords no evidence that sexual intercourse has taken place, nor does its presence prove the condition of chastity. It is often destroyed, during infancy, by care-

less nurses who rub these parts roughly with a coarse towel. I have met with seven instances only, of firm and imperforate hymen in which it was impossible for the nuptial rites to be consummated, and one in which it was present at the parturient period, and in each of which the difficulty was removed by the bistoury.

Along the circumference of the orifice of the vagina, are several small, flat, or rounded reddish tubercles, commonly numbering from two to four, occasionally five or six. Sometimes they are pale, or livid, and vary in firmness. They exist in pairs, the two posterior being generally larger and longer than the anterior. These are termed the *CARUNCULÆ MYRTIFORMES*, and are considered by some anatomists as the remains of the ruptured hymen, while others view them as existing independent of this membrane. I have in three instances, witnessed the unruptured hymen simultaneously with the presence of the carunculæ. As they disappear during the expulsion of the fetus, they may probably be designed for enlarging the capacity of the vulva, thereby diminishing the risk of severe contusion or laceration. When they become so large as to cause unpleasant symptoms they may be removed by the scissors.

Between the posterior commissure of the vulva, or fourchette, and the hymen and the external orifice of the vagina, is a space or depression bearing some resemblance to the cavity of a small boat, which is called the *FOSSA NAVICULARIS*, or *concha*. Its greatest extent is six lines, or half an inch. It is found in girls and in women who have not given birth to children, but is usually ruptured in a first confinement by the efforts made to expel the fetal head, and which is followed by no serious consequences unless more or less of the perineum be likewise involved. It is the most inferior part of the vulva, and hence becomes a receptacle for vaginal and uterine discharges; inflammation and syphilitic ulcerations are frequently located there among public women, which occasion obstinate and intractable difficulties, not easy to cure.

The *PERINEUM* proper, includes the whole of the space between the coccyx and the pubes, including the terminal orifices of the urinary, generative, and digestive apparatus; but in Obstetrics, by the term *perineum*, is meant the space lying between the posterior commissure of the vulva and the anus. It is from an inch to an inch and a half in length, and presents on its external surface, on the mesial line, a prominent, hard ridge, which is termed the *raphe of the perineum*. Externally, the perineum is covered with the skin; internally, it consists of

adipose cellular tissue, of fascia, and of several muscles. In some females it is thick, hard, and resisting; in others it is thin, soft, and easily dilated; conditions which render labor tedious or otherwise, by retarding the passage of the fetal head when rigid and unyielding, or allowing it to pass by a ready dilatation.

In the last stage of labor, the perineum usually offers more or less resistance, but eventually becomes thinner, elongates, and extends, even to four or five inches, thus affording a passage for the child; and it is at this period, when the head is passing, that it becomes occasionally lacerated, or more rarely, perforated through its center. This accident, however, may generally be avoided, by supporting the perineum with the hand, making such firm but moderate pressure as will prevent the head from advancing too rapidly, and which, at the same time, will allow the tissues an opportunity to acquire the proper degree of extensibility. Excessive and injudicious support will undoubtedly effect more mischief than benefit. The condition of the perineum should never be overlooked by the practitioner, as it frequently presents an obstacle to delivery far greater than the os uteri, the straits, and the vagina together, owing to its unyielding resistance; and a labor which, under ordinary circumstances, would be finished in from fifteen to thirty minutes after the head has reached this point, may be continued for several hours. This rigid condition of the perineum is often brought on by excessive meddling, frequent examinations, etc. I have overcome several instances of obstinate resistance, in a very short time, by relaxing the parts by means of a process of dilatation, which may be produced by sweeping the finger through the posterior commissure of the vulva. Rigidity of the perineum is a condition which frequently retards the completion of labor; support to the parts as usually applied is a feeble agent in overcoming it; the sweeping movement, however, if applied at frequent intervals, for a brief period, will, as a rule, result in complete muscular relaxation.

CHAPTER IX.

THE INTERNAL ORGANS OF GENERATION.

THE internal organs of generation, belonging to the female, are, as previously remarked, the vagina, the uterus and its appendages, the Fallopian tubes, ligaments, and ovaries (*Fig. 19*).

The VAGINA is a cylindrical membranous canal, which connects the internal with the external organs of generation; it is

located in the pelvic cavity, being posterior to the bladder and urethra, and anterior to the rectum. Its direction is nearly coincident with the axis of the pelvis, which gives a curved form to it, the concavity of which, is on its anterior or pubic surface, and the convexity on its posterior or rectal surface. The walls of the vagina are soft and yielding, and slightly flattened from before backward—the anterior wall being shorter than the posterior. In well formed women its length is five or six inches, and its width one; but this usually varies according to age, and the different circumstances of life. In girls, it is longer and narrower than in married women, and especially those who have borne children; and in African women it is longer and wider than in European. The middle portion of the vaginal tube is larger than at the extremities, and the lower or inferior orifice is more contracted than at its upper or superior extremity. The walls of the vagina are generally in contact, when undisturbed. As females advance in years, the vagina gradually contracts its dimensions to nearly those found in young girls. It is composed of a fibrous and mucous membrane; the first is placed externally, and consists of condensed cellular tissue, highly elastic, and of a reddish color.

The *external surface of the vagina* is united, in front to the base of the bladder and to the urethra, by cellular tissue, which becomes denser as it approaches the vulva; behind, to the rectum, by similar cellular tissue, but which is less dense than in front; laterally, to the broad ligaments and ureters above, and below to the umbilical arteries, the sacral plexuses, the hypogastric vessels, the levator muscles of the anus, and the pelvic cellular tissue; and superiorly, above and behind, by a double fold of peritoneum.

The *internal surface of the vagina* is divided into an anterior and a

FIG. 19.

THE INTERNAL FEMALE GENITAL ORGANS.

- A. The Uterus, seen on its Anterior Face.
- B. The Intra-vaginal portion of the Neck of the Uterus.
- C C. The Fallopian Tubes.
- D. The ambricated Extremities of the Fallopian Tubes.
- E E. The Ovaries.
- F. The Ligament of the Ovary.
- G G. The round Ligaments.
- H. The Vagina laid open.

On the right the ambricated extremity of the Fallopian Tube is seen applied to the Ovary.

posterior wall. In the center of each of these parietes is a longitudinal line or ridge, the one on the anterior being more distinct and prominent than that on the posterior wall; these ridges are called *columnæ vaginae*, or columns of the vagina—one, the anterior column of the vagina, the other, the posterior column of the vagina. One or two tubercles are generally found at their inferior terminations. These columns are intersected at right angles by transverse parallel rugæ, folds or wrinkles, which become more prominent and approximate more closely as they advance toward the vulva; these rugæ, however, do not constantly exist; they are more distinctly marked in girls and in aged women; and during pregnancy, as well as for a short period after parturition, they are nearly effaced. Some writers consider them as aids to the enlargement of the vagina during labor; others, that they assist in the elongation which it undergoes during pregnancy, caused by the ascent of the uterus; and others again, that by multiplying the points of contact between the vaginal walls and the male organs, the voluptuousness of coition is increased.

The *superior, internal, or upper extremity of the vagina*, is attached around the upper part of the neck of the uterus, being a little higher behind than in front. The peculiar manner by which it embraces the neck, gives rise to a circular fissure or groove, to which the name *cul-de-sac* has been applied; the one in front, being termed the *anterior cul-de-sac*; that behind, and which is more distinctly marked, the *posterior cul-de-sac*. These *culs-de-sac* are of greater or less depth, according to the projection of the neck of the uterus. This portion of the vagina is in immediate contact with the peritoneum, which separates it from the abdominal cavity; and it is here where injuries are most commonly inflicted by the use of instruments, often resulting in inflammation and death; hence, when operations are demanded, great care should be observed by the operator.

The *inferior, external, or lower extremity of the vagina*, sometimes termed the external or vulvar orifice, which terminates below the urethra, is narrowed at its entrance, and, in the virgin, is usually partially closed by the hymen.

The *internal parietes of the vagina* are composed of a mucous membrane, which is the continuation of that of the vulva, and the internal membrane of the uterus; inferiorly, this membrane is of a red or vermillion tinge, and superiorly it has a whitish or grayish appearance. Occasionally, it presents posteriorly, bluish or livid spots, which are more or less irregular. It is furnished with numerous mucous follicles, the secretions from which constantly keep the parts during health, and

especially during parturition, in a state of lubricity. If this organ becomes dry and inflamed, while labor is progressing, a rigid and unyielding condition of it ensues, which must necessarily occasion much distress to the patient; hence the importance of examining during labor, as seldom as possible, because the frequent introduction of the finger into the vagina not only removes the moisture of the parts, but likewise irritates them; beside frequent touchings are useless, deleterious, and immodest.

The part surrounding the orifice of the vagina, is termed *the bulb of the vagina* or the *plexus retiformis*; it is a dense, compact, erectile spongy tissue, somewhat resembling that of the corpus spongiosum urethræ, of a grayish or bluish color, about an inch in breadth, and two or three lines in thickness. During the venereal orgasm, it contracts the vaginal cavity, and thus increases its resistance. The *sphincter vaginae* or *constrictor vaginae* muscle is formed by some muscular fibers on the outside of this spongy tissue; it contracts the vaginal orifice, and depresses the clitoris.

The arteries of the vagina come from the internal iliac; its veins, which are numerous, form a kind of net-work called plexiform, and flow into the hypogastrics; its nerves arise from the sacral plexus, and its lymphatics are lost in the hypogastric lymphatic plexus. The contractility of the vagina is of the peculiar elastic character common to all cellular structure. As soon as the fetus has been expelled, this organ resumes its natural condition in a very short time, except in cases where the head has been confined in the cavity for a longer period than usual, when its contraction will not take place for one or two hours; and the hand may be very readily introduced within it for some hours after delivery.

The vagina serves as a medium through which external bodies may pass toward the uterus, as during copulation, and also through which the uterine contents and vaginal secretions may pass off, as the fetus, menses, etc. It is subject to inflammation, ulceration, eversion, inversion, etc., the history and treatment of which, more properly belong to a treatise on "Diseases of Women."

The UTERUS, or *womb*, is a hollow organ, whose principal functions are to receive the impregnated ovum, as it escapes from the Fallopian tube, to assist in its nourishment, growth, and preservation, until the parturient period arrives, and then to act as the principal agent in forwarding its expulsion. It is a *gestative* not a *generative* organ.

In shape, the uterus is conical or pyriform, usually described as resembling a pear flattened from before backward, with its base turned upward, and its apex downward. It is situated obliquely in the pelvic cavity, below the small intestines, between the bladder and rectum, and above the vagina; and is retained in its position by the round and broad ligaments, and the vagina. Its axis or long diameter very nearly corresponds with the axis of the superior strait. In very young females its base is below the superior strait; in adults it is nearly on a level with it.

In childhood it is quite small, but rapidly increases in growth toward puberty and adult age, and after the period of child-bearing, it diminishes to nearly its infantile size. Its average length, in the adult woman, is two and a quarter to three inches; its breadth at the fundus, one and a third to two inches. and toward the neck, including the os tincæ, one inch to one and a half inches; and its thickness from eight to twelve lines, or from four to six lines for each of its walls.

Immediately previous to menstruation and during that term, it usually becomes greatly augmented in volume, which may be mistaken for the commencement of a pregnancy. Its weight, in the virgin female, is seven or eight drachms, and in those who have had children, from twelve drachms to an ounce and a half, while in the aged female it dwindles to one or two drachms.

The uterus is divided into three parts: 1, the *base* or *fundus uteri*, which is only a few lines high, being confined to all that portion which rises above the insertion of the Fallopian tubes; 2, the *body* or *corpus uteri*, which is the largest division of the uterus, and includes all that part of the organ situated between the fundus and the neck, or contracted portion; 3, the *neck* or *cervix uteri*, which is the contracted and elongated portion found below the body, about an inch in length, and which is embraced by the vagina, forming in its cavity a projection of four to six lines, at the extremity of which is an opening, termed *os tincæ*, from its fancied resemblance to the mouth of the tench fish, also called *os uteri externum*. The orifice, at the junction of the uterine cavity with the superior extremity of the canal of the cervix, is termed *os uteri internum*. The uterine sound is frequently checked in its progress to the uterine cavity at this point, from contraction, and generally with more or less pain; but if the instrument be held steadily, pressing lightly upon the parts, the contraction will yield, and the sound pass onward. But this should not be persisted in when severe pain persists.

Generally, the uterus is slightly inclined to the right, sometimes to

the left, or backward. Its position, however, is not constant, being determined by its own condition, as well as that of the neighboring parts. Thus females, in whom the vagina is short, will have the axis of the uterus approximating that of the inferior strait; sometimes the fundus is thrown so far forward that the anterior wall is the most inferior part, constituting an *anteversion*; at other times it may be the reverse of this, the fundus being thrown in the hollow of the sacrum, and the neck behind the symphysis pubis, producing a *retroversion*; or, the fundus may be thrown to one side of the pelvic cavity, with the neck to the opposite side, which is termed *lateral version*; and again, the body of the uterus may be bent on the neck, either behind or in front, constituting an *anteflexion* or *retroflexion*.

We distinguish, in the uterus, an external and an internal surface. The **EXTERNAL SURFACE** is divided into an anterior and a posterior face, a superior and two lateral borders, two superior angles, and an apex.

The *anterior face* is smooth, polished, slightly convex, covered on its superior two-thirds by a prolongation of the peritoneum, and is in contact with the posterior face of the bladder, from which it is sometimes separated by some folds of the small intestine; inferiorly, it is united to the base of the bladder by loose cellular tissue, and which adhesion may account for the involvement of the bladder in many uterine displacements.

The *posterior face* is more convex than the anterior, and is covered throughout its whole extent by a prolongation of the peritoneum; it is likewise in contact with the anterior surface of the rectum looking toward the concavity of the sacrum. The *superior border*, base or fundus, is convex, looking upward and forward, and is covered in its whole extent by a prolongation of the peritoneum, and by the convolutions of the small intestines. In the unimpregnated state it never reaches the level of the superior strait, and can not, therefore, be felt through the inferior abdominal wall, except by making considerable pressure. The *two lateral borders* are irregular, being convex in their superior half, and concave in their inferior; they are situated between the two duplicatures of the peritoneum; which constitute the broad and round ligaments, and which ligaments being attached to the anterior edge of the lateral borders, are consequently on the same plane as the anterior face of the uterus. The *two superior* [*grooved*] *angles*, or *cornua uteri*, are formed at the junction of the superior with the two lateral borders, and from which point arise the Fallopian tubes

and ovarian ligaments; the *apex* is the inferior extremity of the uterine neck, and is situated in the upper part of the vagina.

The CERVIX UTERI, or NECK OF THE UTERUS, should be thoroughly studied by the practitioner, with regard to its form, size, and consistence, in order to facilitate his diagnosing the state of pregnancy, full term, etc., as well as the many abnormal conditions to which it is liable.

The neck of the uterus in the adult female, who has never borne children, will be found to vary considerably from that of one who has; it is from twelve to fifteen lines in length, cylindrical, flattened from before backward, and fusiform; being about nine lines in its transverse diameter at the center, and from four to six lines at its extremities. It is embraced by the vagina toward its upper portion, leaving about two-thirds within the vagina, and one-third above the vaginal adhesion. The inferior or vaginal extremity of the neck, is of less volume than any other part of it, and is perforated in its center by a transverse fissure or orifice, of one or two lines in length, to which several names have been applied, as, *os tincae*, *os uteri*, *os internum*, *mouth of the womb*, *uterine orifice*, etc. In the virgin, this orifice is completely closed up, and is sometimes difficult to find; the sensation conveyed to the finger in contact with it, is similar to that experienced by feeling the depression between the *alæ nasi*, at the end of the nose, with the pulp of the finger, and which sensation will assist us in recognizing the opening. The *os tincae* divides the apex into two lips, an anterior and a posterior lip. These lips are smooth, regular, small, firm, thin, and closely approximated; the one anterior being slightly thicker and more prominent than the posterior. As the long diameter of the uterus is nearly parallel with the diameter of the superior strait, the face of the apex will be found looking toward the lower portion of the sacrum, in an inclined position; from which arrangement the anterior lip will be found a little lower down than the posterior.

In the woman who has borne children, the uterine neck varies in its extent, being reduced in length, according to the number of births, so much so, that instances are recorded in which the mothers of nineteen or twenty children had the portion within the vagina completely destroyed; the orifice is usually deformed, gaping, larger, and less regular, and sufficiently patulous to admit the introduction of the end of the finger; the lips are thicker and softer than in the virgin, and are filled with fissures or inequalities, which are more frequent on the left side of the neck, and are the results of lacerations of the fibers

which occur during the passage of the child's head through the os uteri, and which have been prevented from uniting by the lochial discharges. These fissures are of variable depth, and sometimes are so numerous as to divide the lips into eight or ten small tubercles. These differences are of much importance in legal medicine; yet they may occasionally be produced by other causes than parturition, or may even be wanting in the mother.

The INTERNAL SURFACE of the uterus presents a narrow, oblong, irregular cavity, with contiguous walls, which is divided into two parts, the *cavity of the body* and the *cavity of the neck*. (Fig. 20.)

The *cavity of the body* is triangular in shape, flattened, and when empty is not very extensive, being hardly large enough to contain a split almond. At each of its three angles there is an orifice, the lower or inferior one leading to, and establishing a communication with, the cavity of the neck, and the two upper or superior ones forming the entrance into the Fallopian tubes; the openings in these latter are very narrow, and will scarcely admit a hog's bristle. Occasionally, this opening is divided by a perfect septum, which may render superfetation possible, and very rarely there exists a congenital deficiency of it. In the absence of the catamenial discharge this cavity is constantly moistened by a sero-mucous fluid.

FIG. 20.

„ A „

CAVITY OF THE UTERUS, AND THE FALLOPIAN TUBES.

- | | |
|--|---|
| A. Fundus of the Womb. | F F. The Ovaries. |
| B. Cavity of the Womb. | G G. The round Ligaments. |
| C. Cavity of the Neck of the Womb. | H H. The Ligaments of the Ovaries. |
| D D. The Canal of the Fallopian Tubes laid open. | I. The Cavity of the Vagina. |
| E E. The Umbilical Extremities. | b, H'. The Uterine Orifices of the Fallopian Tubes. |

The canal, or *cavity of the neck*, affords a communication between the cavity of the body and the vagina; it is oval and cylindrical, about twelve or fifteen lines in length, and five or six in its greatest breadth; it is fusiform, flattened from before backward, presenting on its

anterior and posterior wall several longitudinal and transverse rugæ or wrinkles, to which the terms *arbor vitæ internus*, *palmæ plicatæ*, and *penniform rugæ*, have been applied; they are formed by the lining membrane of the neck, and which are so arranged as to represent a fern leaf in relief; they extend during the dilatation of the mucous membrane of the cervix in the uterine development from gestation, and during parturition, and frequently disappear after delivery. On the mucous membrane of the neck are a number of muciparous follicles, more abundant about the os uteri, which were mistaken by Naboth for eggs, and hence have been called *ovula Nabothi*, *glandula Nabothi*, or the *glands of Naboth*. In the healthy uterus of the virgin, these follicles can hardly be seen; but during pregnancy, or when disease attacks the parts, they enlarge so as to be readily recognized by the eye, and when touched with the finger they feel like shot. During pregnancy, they secrete a thick, tough, pellucid, gelatinous mucus, in quantity sufficient to close up the cavity, and thus prevent any communication between the cavity of the body and the vagina. The internal surface of the neck is less vascular than in the body. Ciliated cylinder epithelium is observed upon the mucous membrane of the canal of the cervix, but, at its lower part, instead of cylinder there is squamous epithelium resembling that of the vagina, and beneath which are found verrucose or filiform papillæ, containing one or two vascular loops; those seated more directly in the neighborhood of the os uteri apparently possess a peculiar sexual sensitiveness.

The character of the uterine tissue is very difficult to understand in its unimpregnated condition, but becomes more manifest during gestation. Its constituent parts are: an external peritoneal membrane, an internal or mucous membrane, a peculiar tissue, and numerous blood-vessels and nerves.

The *external peritoneal membrane* is furnished by the peritoneum, which, after having covered the posterior surface of the bladder, is reflected from behind forward, upon the anterior face of the uterus, covering its superior three-fourths, and extending over the fundus uteri and posterior surface of the uterus; it is then prolonged on the vagina for a short distance, and from thence reflected upon the rectum. In front of, and behind the uterus, this membrane forms four small falciform folds; those which are in the space between the bladder and uterus are named the *vesico-uterine*, or *anterior ligaments*; and those situated between the rectum and uterus, being termed the *recto-uterine*, or *posterior ligaments*. On the borders of the uterus the attachments

of the peritoneum are quite loose, but become more intimate toward the median line.

The existence of the *internal*, or *mucous membrane*, has been very much doubted by many anatomists, as may be seen from the following observations by Moreau:

“On examination, we find the inner surface of the body of the uterus to be soft, pulpy, having neither the brilliancy of the peritoneum, nor the whiteness of the mucous membrane of the vagina; of a reddish or blackish brown color; it generally contains, whatever may have been the circumstances preceding the death of the woman, a brown or dirty gray fluid. When the uterus is macerated, or boiled, or dissected soon after death, it is impossible to trace the mucous membrane beyond the cavity of the neck. If, on the other hand, we observe that all the hollow organs provided with mucous membranes, such as the stomach, intestines, bladder, and the vagina itself, and which are required, by their functions, to change in size, present, when empty, a rugose surface and folds more or less projecting, formed by the lining membrane; that this membrane is furnished, moreover, with numerous follicles, which pour out mucus intended to protect the organ from the irritation of the substances or bodies they may contain, or which may pass through them, we will see that no similar arrangement obtains in the cavity of the body of the uterus; the follicles are found only in the cavity of the neck; they are there disposed symmetrically, on four opposite lines, two on the anterior and two on the posterior paries. If the uterus were provided with a mucous membrane, could it bear the enormous enlargement resulting from pregnancy, without lacerations of its internal surface, such as frequently occur in the vagina at the time of delivery, and of which traces may be seen almost always in women who have borne children? Moreover, in advanced age, we often find obliteration of the cavity of the body of the uterus, as well as of the tubes. We have long observed this fact, which is confirmed by the researches of Mayer, reported by Breschet, and what is very remarkable, this obliteration, the natural consequence of age, does not extend beyond the internal orifice, at the point at which we have said the mucous membrane terminates. In organs lined by a true mucous membrane, the cavity always remains. In old cases of artificial anus, that part of the intestinal canal below the accidental opening, no longer giving issue to fecal matter, contracts, but never consolidates.

“We shall terminate these considerations by a single remark. The serous and mucous tissues, evidently communicate by means of the

aperture of the Fallopian tubes. Is there a point at which these tissues change, and are transformed into each other? Undoubtedly there is; but where is it? Is the serous tissue suddenly arrested at the digitations of the tubes? Does it line the cavity of the fimbriated extremity? Does it extend along the tube as far as the uterus? Or does the mucous tissue occupy the whole cavity? Is the latter prolonged, as it is said, into the cavity of the tube? Does it terminate at the fimbriated extremity, or extend beyond? This can not be demonstrated. If it be impossible to assign the precise point at which one of these tissues commences, and the other ends, is it not reasonable to regard the cavity of the body of the uterus, and of the Fallopian tubes, as respiratory surfaces, intermediate by their position, organization, and uses, to the serous and mucous tissues; upon them the transformation is exerted, but in a gradual, successive manner, without being able to determine accurately the point of mutation.

"This opinion acquires more value if we observe that the exhalations of the internal surface of the uterus are not identical over its whole extent. Haller had already found in the cavity of the body, a serous, whitish, muddy, and thin liquid, which, in the uterus of a newly born child, resembled milk, while that in the cavity of the neck was a thick, dense, and reddish mucus. The exhalations of the cavity of the body of the uterus, present under various circumstances, but normal for them, the characters of exhalation of the mucous and serous tissues, alternately morbid and physiological. Thus, in ordinary health, the matter exhaled by the uterine cavity, has a great analogy with mucus. When this surface is excited in a special manner by the act of generation, the fluid produced resembles more the serous exhalations; it is a concrescible, plastic lymph, which becomes condensed, and quickly changed into a species of false membrane, the *caluca*. When simply the seat of some fluxive function, as at the menstrual periods, a phenomenon is manifested which belongs equally to overexcited or highly inflamed mucous and serous tissues, a sanguine discharge is established, the affluxus is dispelled, and nature resumes her usual course.

"We may hence conclude, that the cavity of the body of the uterus possesses no mucous membrane; or if it exists, it has undergone such modifications as to leave no longer any resemblance to the same tissue in other parts."

Cazeaux, likewise, observes in relation to this membrane: "To the reasons already offered by Morgagni, Chaussier, etc., in favor of its existence, we shall add those presented by Cruveilhier, which appear

to us perfectly conclusive, viz.: 1st. Every organic cavity communicating with the exterior is lined by a mucous membrane. 2d. Anatomy demonstrates that the vaginal mucous membrane is continued into the cavity of the neck, and then into that of the uterus, only it is deprived of its epithelium in penetrating the latter. 3d. When examined by a lens, the internal surface of the uterus exhibits a papillary disposition, but the papillæ are imperfectly developed. 4th. This internal surface has follicles or crypts spread over it, from which mucous can be squeezed out, and which, if their orifices be obstructed or obliterated, become distended by the liquid, and form little vesicles. 5th. It is continually lubricated by mucus. 6th, and lastly; the internal surface of the uterus, like all other mucous membranes, is subject to spontaneous hemorrhages, to catarrhal secretions, and to the mucous, fibrous, and vesicular vegetations, called *polypi*; and it is generally admitted that, wherever there is an identity of action, there is also an identity of nature."

That the inner membrane of the uterine walls is composed of a mucous body or tissue, has, according to the recent microscopic observations of M. Coste, and others, been decided in the affirmative, and which is probably continuous with the lining mucous membrane of the vagina, and of the Fallopian tubes, but which has no submucous tissue, being closely attached to the muscular coat. It consists of tubular *utricular follicles* or *glands*, arranged perpendicularly with the surface, simple or bifurcated, spirally contorted at the end, from one thirty-third to one fiftieth of a line in diameter, their length being that of the thickness of the mucous membrane, and consisting of very delicate membrane and ciliated cylindrical epithelium; the cilia vibrating from below upwards, and thus very likely aiding in conveying the spermatic filaments to the Fallopian orifices. The secretion from these glands probably forms the decidua.

The *peculiar tissue* of the uterus, which is under the mucous membrane, and is named the *middle, fleshy, or muscular coat* of the uterus; is very dense in structure, resisting, of a dirty grayish color, being sometimes slightly pearly near the neck, crackles like cartilage under an incision with the scalpel, and constitutes the greater part, if not the fundamental structure of the organ. In the unimpregnated state of the uterus, it is very difficult to determine the true character of the uterine tissue, as it varies in color and density, its fibrous organizations being concealed by the state of condensation of the organ. There has been considerable difference of opinion upon this point, some viewing it as belonging to the fibrous tissue, and others to the muscular; the

condition of pregnancy, however, removes all doubt and uncertainty, and presents to us a true muscular tissue.

The *arteries* of the uterus come from the hypogastrics, or internal iliacs, under the name of uterine arteries, and from the aorta, or renal arteries, under the name of ovarian or spermatic arteries. The uterine arteries penetrate the uterus by its lateral borders, and describe a number of flexuosities in the proper tissue of the organ; the branches of the same side frequently anastomose with each other, and unite on the median line with those of the opposite side. They likewise communicate above and laterally with the branches of the ovarian arteries, and terminate in the interior tissue, continuing into the veins, and, probably, presenting orifices within the uterine cavity.

The *veins* follow the course of their respective arteries; they are very numerous, have no valves, and empty into the corresponding trunks: the right spermatic into the inferior cava, the left into the renal vein, and the uterine veins into the internal iliacs. The arrangement of the veins, in the uterine tissue, is analogous to that observed in the corpora cavernosa, and the erectile tissues; and their orifices on the internal surface of the uterus, are very large during pregnancy, and become visible just after delivery.

The *nerves* are derived, one portion, from the sacral plexus of the cerebro-spinal system, which more especially supplies the cervix with nervous filaments, and, consequently, renders it more sensitive to the touch than any other part of the organ; the other portion, being destined to the organic life alone, is from the great sympathetic nerve, which supplies the body of the organ with filaments, and which will explain to us how most of the vital organs of the body, especially the brain and stomach, sympathize so readily with the uterus, both in disease and during pregnancy. The performance of the several functions of menstruation, conception, and parturition, is, without doubt, chiefly owing to the influence of the uterine nerves.

The *lymphatic vessels* are very numerous, and arise from different parts of the organ, forming reticulations, branches, and trunks, which, united in bundles, leave the uterus in three different directions. The least numerous leave the abdomen by the inguinal canal, and are distributed to the inguinal ganglia; others, united to the lymphatics of the vagina, accompany the uterine and vaginal arteries, and terminate in the hypogastric lymphatic plexus. But the most numerous arise from the anterior and posterior surfaces of the neck and of the body, run toward the lateral borders, follow their direction, are then united with those of the ovaria, the tubes, and fundus uteri, ascend:

with the ovarian arteries and veins, in front of the psoas muscle, to join the ganglia situated in front of the aorta, the vena cava, and in the vicinity of the kidneys.

All the above vessels, etc., are very small during the condensed or unimpregnated condition of the uterus, but increase in size during pregnancy, and at full term acquire an enormous size, supplying the organ with torrents of blood. The lymphatic vessels, also, play a very important part in the diseases of the uterus.

Sometimes the uterus is absent entirely, at others but slightly developed, or it may be malformed, or in an abnormal position. It is liable to hernia, prolapsus, retroversion, anteversion, inversion, ulcerations, inflammations, etc., the history and treatment of which may be found in any treatise on the diseases of women.

CHAPTER X.

OF THE UTERINE APPENDAGES—THE LIGAMENTS, THE FALLOPIAN TUBES, AND THE OVARIES.

THE uterus is supported, in the pelvic cavity, by six duplicatures of peritoneum—two *anterior*, or *vesico-uterine*, and two *posterior*, or *recto-uterine* ligaments, to which reference has been heretofore made; also two *lateral*, or *broad ligaments*, which are much larger and more important than the others, as within them we find contained the *round ligaments*, the *Fallopian tubes*, and the *ovaries* (*Fig. 19*).

The BROAD LIGAMENTS are formed by two duplicatures of the peritoneum, which, covering the anterior and posterior faces of the uterus, are prolonged transversely, extending to the ilia; these two folds rest against each other, and divide the pelvis into two cavities—the anterior cavity containing the bladder, and the posterior the rectum. These ligaments are of a quadrilateral shape, and from their supposed resemblance to the wings of a bat extended, have been named the *alæ vespertilionis*. Outwardly, and below, these ligaments are continuous with the peritoneum that lines the excavation; their upper, or superior border is loose, and extends from the angles of the uterus to the iliac fossæ, presenting three small folds, called *alæ*, or *wings*. The anterior wing is not distinctly developed, and is denied by some anatomists; it is occupied by the *round ligament*. The mid-

dle wing incloses the *Fallopian tube*, and the posterior contains the *ovary* and its ligament.

The space between the two serous folds, constituting the broad ligament, is filled by a loose and very extensible lamellated cellular tissue, continuous with the *fascia propria* of the pelvis, and which is traversed by the uterine vessels and nerves. As gestation advances, and the uterus enlarges, the two laminae of the peritoneum separate to receive the uterus, assisting to cover its anterior and posterior surfaces, and in consequence, during the latter month of pregnancy, the broad ligaments entirely disappear.

The **ROUND LIGAMENTS**, or *supra-pubic cords*, are two in number, one on each side; they are of cylindrical form, six or seven inches in length, of a fibrous appearance, and of a grayish white color. They arise from the lateral borders of the uterus, below and a little in advance of the Fallopian tube, and are directed upward and outward, following the direction of the pelvis; they are enveloped in a cellular tissue, and are covered by a prolongation of the peritoneum, to which the name "Canal of Nuck," has been given. They enter the inguinal canal on each side, traverse it, emerge by the corresponding inguinal ring, and divide in front of and above the pubes into a number of fibrous fasciculi, which are lost in the cellular tissue of the groins, mons veneris, and labia pudendi. They contain a great number of veins, which are liable to become varicose.

There has been considerable controversy as to the structure of these ligaments, but the investigations of modern anatomists have ascertained them to be expansions or prolongations of the muscular fibers of the uterus, containing blood-vessels, nerves, lymphatics, and cellular tissue.

The real uses of the round ligaments are not satisfactorily known; they are supposed to be, to retain the uterus in its proper position, and to prevent its displacements. During pregnancy, chronic affections, or uterine displacements, these ligaments are subject to inflammation and engorgement, and which conditions may, probably, be the cause of the pains in the groins, frequently experienced by women thus circumstanced.

The **FALLOPIAN**, or **UTERINE TUBES**, (*oviducts*, *vector canals*), are two cylindrical canals, from four to five inches in length, of a conical shape, flexuous and waving, and extend from the upper or superior angles of the uterus to the ovaries; they are placed in the

thickness of the middle wing of the broad ligaments. The internal cavity of these tubes is very narrow at their uterine extremities, but, as they extend outwardly, it gradually increases in size, but again contracts just before opening at the fimbriated extremity. The internal extremities of the tubes are inserted into the superior angles of the uterus, where they open into the cavity of its body, their orifices being named the *internal* or *uterine*. The external or free extremities of the tubes, called the *fimbriated extremities* or *pavilion*, communicate with the peritoneal cavity by an oblong, inverted opening, with digitated or fringed edges, of which one is longer than the other, curved, and inserted into the external extremity of the ovary; the other hangs loosely over the ovarium. The openings at these ends of the tubes are named the *free orifices of the tubes*; the orifice at either uterine angle is called the *ostium uterinum*, that at either fimbriated extremity, the *ostium abdominale*.

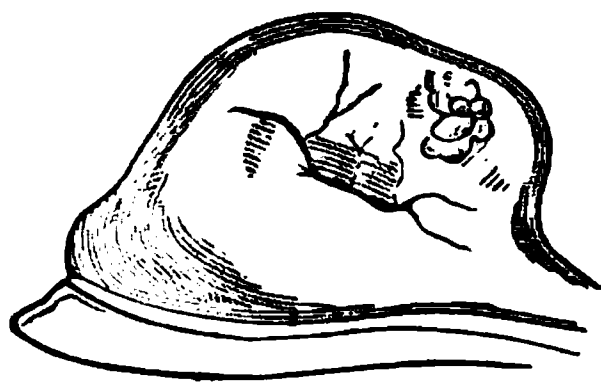
The tubes are enveloped by the peritoneum, which forms the outer or external tunic or membrane; the internal membrane is a prolongation of the uterine mucous membrane (which, however, is denied by some authors), and is also continuous with the serous peritoneum; the tubes are composed of two laminæ of unstripped muscular fibers, the exterior of which have a longitudinal direction, while the internal are circular. Their vessels are derived from the ovarian arteries, and their nerves from the great sympathetic. The middle layer or proper tissue of the tubes, is a continuation of, and identical in texture with, that of the uterus. The internal lining mucous membrane of the Fallopian tubes is thin, in longitudinal folds permitting dilatation, and is covered by ciliated cylindrical epithelium, the movements of which are directed from the ostium abdominale to the ostium uterinum.

The Fallopian tubes serve to conduct the fecundating principle of the male to the ovaries, and to seize the impregnated germ or ovule of the female and transmit it to the uterus. At the moment of fecundation, the fimbriated extremity grasps the escaping ovum (*morsus diaboli*), and probably also at each menstrual period; a failure of this action, or of the peculiar offices of the tubes, may, probably, be a cause of extra-uterine pregnancy.

The OVARIES furnish the ovula which contain the rudiments of the future animals; they are situated in the thickness of the posterior wing of the broad ligaments, behind and below the Fallopian tubes; they are two in number, oblong, oval, whitish, twelve or fifteen lines long, and flattened from before backward, being about the size and shape of

an almond. Previous to puberty, and sometimes in virgins and women who have not borne children, their surface is polished and embossed; but after puberty, owing to the escape of the ova, they become rough and fissured. Their superior border is convex and loose; their inferior, straight, or slightly concave, and adhering to the broad ligaments, by which they are maintained in position, as also by a special one, named the ligament of the ovary (*ligamentum ovarii*), a dense, imperforate cellulo-fibrous cord, which fixes the internal ovarian extremities to the uterus. The external extremities are joined to, or approximate, the fimbriated Fallopian extremities. The nerves of the ovaries come from the renal plexus, and the blood-vessels which are called the ovarian, have a similar origin with the spermatic vessels in the male. The situation of the ovaries varies according to circumstances; in the fetus they are in the lumbar region; during gestation they rise into the abdomen along with the body of the uterus, upon the sides of which they are attached; and immediately after delivery, they occupy the iliac fossæ, where they sometimes continue through life. It is not uncommon to find them turned backward, and adhering to the posterior uterine surface. They likewise vary in size, being larger in proportion in the fetus than at maturity, decreasing after birth, enlarging at puberty and during pregnancy, and dwindling away as old age approaches; they frequently become the seat of organic alterations. (*Fig. 21.*)

FIG. 21.



EXTERNAL FACE OF THE OVARY

The external covering of the ovaries is obtained from the peritoneum, and is named the *indusium*. Beneath this covering, the body of each ovary is invested with a whitish, dense, fibrous membrane, called the *tunica albuginea*, which is the proper tunic of these organs, and which may be considered as an expansion, or extension of the ovarian ligaments. From the internal surface of this membrane proceed prolongations which divide the ovaries into many small cells filled by their proper tissue. The parenchyma of the ovaries, or tissue proper, is of a reddish brown color, spongy, dense, and vascular, bearing some resemblance to the erectile tissue, it is called the *stroma*; in this tissue are found imbedded a number of small transparent follicles or vesicles, varying in size from the smallest pin's head to that of a large shot, the smaller being within—the larger and better developed more toward the surface. These last sometimes produce small

elevations on the stroma, which give a rough or tuberculous appearance to the whole ovary; they are called the *ovisacs*, or *Graafian vesicles*, after De Graaf, who gave a description of them.

The Graafian vesicles number from fifteen to twenty in the adult female, in, or near a state of maturity, but with the aid of a microscope many more can be seen which gradually become developed as the others perfect their function. They are hardly visible in children and old women, but are very distinct during the menstrual life. (*Fig. 22.*) Each ovary at birth contains not less than thirty-five thousand ova. (*Foulis.*)

The *vesiculæ Graafianæ*, consist of two separate tunics; 1. The *external tunic* or *tegument*, which is firm, fibrous, and vascular in its character, like the stroma or proper ovarian tissue; 2. The *internal tunic*, formed of dense cellular tissue, but thin, smooth, delicate, diaphanous, and easily torn; some consider it destitute of vascularity, which is, again, denied by others. From the close approximation of these two tunics, it is sometimes difficult to separate them.

The internal face or cavity of the inner tunic contains the *nucleus*, comprising: 1. The *granular membrane*, which is a delicate membrane formed of granules or cellules. This membrane is exceedingly thin and very easily torn; its thickest portion corresponds with the free side of the vesicle, or that portion which is nearest the surface of the albuginea, and here the granulations are more numerous, constituting the *cumulus proligerus*, or *discus proligerus*. 2. A fluid either limpid, reddish, or slightly lemon-colored, concrescible, and composed principally of albumen, as it is coagulated by heat, alcohol, and the strong acids. In this liquid float, vitellary corpuscle, oil globules, and a great number of small grains, which settle themselves, touching each other, upon the inner wall of the vesicle, and form the above named granular membrane. 3. The *ovule* or *human egg*, which is found in the center of the proligerous disk. (*A, Fig. 22.*)

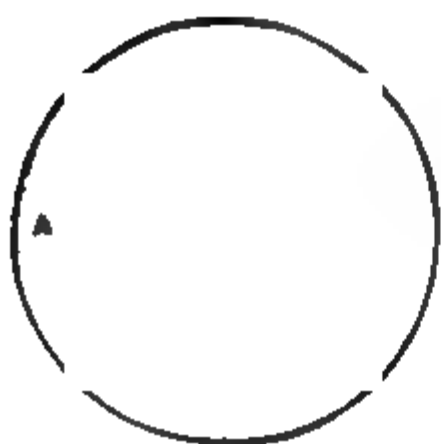
The OVULE, or HUMAN EGG was first discovered as a distinct organ in the Graafian vesicle by Charles Ernest Baer, though DeGraaf had suggested the idea previously. It is imbedded, as stated above,

FIG. 22.

THE OVULE IN THE GRAAFIAN VESICLE.

- A. The Ovule about 1-10 a line in diameter.
- G'. The Granular Cumulus, or Proligerous Disk.
- K. The Cavity of the Graafian Vesicle.
- M. The Mucous Surface.
- V. The Vascular Layer.
- F. The Fibrous Layer.
- P. The Peritoneal Coat.
- G. The Granular Membrane.

FIG. 23.



A NON-FECUNDATED OVULE OR HUMAN EGG.

- A. The Vitelline Membrane, or Transparent Zone.
- B. The Vitellus, or Yolk.
- C. The Germinal Vesicle, or Vesicle of Purkinje, about 1-60 of a line in diameter.
- D. The Germinal Spot, from the 1-400 to the 1-600 of a line in diameter.

in the midst of the proligerous disk, and is perfectly formed in the ovary during the earlier years of life. It is extremely minute and hardly to be seen by the naked eye, but when examined with the microscope, presents an opaque, rounded appearance. Bischoff says: "The largest human ovules I have seen and manipulated, did not exceed the tenth of a line, being barely perceptible to the naked eye." As seen by the microscope, the ovule is possessed of an exterior covering called the *vitelline membrane*, *transparent zone*, *cortical membrane*, or *chorion*; of a substance denominated the *yolk* or *vitellus*, and of a vesicle within the yolk, termed the *germinal vesicle*.

The *Zona Pellucida*, or *vitelline membrane*, is an elastic, thick, hyaline, and transparent membrane, without a determinate texture, whose external and internal outlines assume the appearance of two circular lines inclosing a transparent ring. (A, Fig. 23.)

The *yolk* or *vitellus* of the human ovum occupies the cavity of the vitelline membrane; it is formed according to Bischoff, of a coherent indistinctly granular, yellowish, transparent, and viscous mass, which does not run out when the egg is cut or crushed; each portion of the zone reserving its particular segment of yolk, or the latter escaping altogether. It usually fills the interior of the vitelline sphere completely, though it is sometimes smaller, and its granulations are placed in juxtaposition with its sole envelope, the transparent zone. (B, Fig. 23.)

Within the yolk, or on one of the points of its circumference, is discovered a slightly oval, colorless, and perfectly transparent vesicle, consisting of a very delicate membrane, which incloses a clear and transparent liquid, but which occasionally contains a few granulations. This colorless vesicle scarcely measures the sixtieth of a line in diameter, is surrounded by a mass of deep yellow, and is identical in character with that found in the unfecundated eggs of birds. Fecundation destroys it. This is called the *germinal vesicle* or the *vesicle of Purkinje* (C, Fig. 23). The honor of its discovery is variously attrib-

uted to Purkinje, Baer, and Coste, though the latter is more justly entitled to it.

If, according to Wagner, the germinal vesicle be attentively examined with the lens, at four or five hundred diameters, there will be seen on some part of its periphery, a small, dark, round spot, which consists of a collection or stratum of fine, small lenticular granules or globules, and which stratum appears to be the true living animal germ, existing previously to impregnation. This is called the *germinal spot*, and was contemporaneously discovered and described by Professor Rudolph Wagner, of Germany, and T. Wharton Jones, of England. Two, or more germinal spots have been met with in the mammiferæ. (D, *Fig. 23*).

The ovule, therefore, previous to impregnation, is composed: 1, of an exterior tunic, the *zona pellucida* or *vitelline membrane*, within which is contained, 2, a *yelk*, which again incloses, 3, a vesicle, the *germinal vesicle*, within which we find, 4, a dark spot, the *germinal spot* or germ from which it is presumed the future man originates, after it has been fertilized by the male semen.

The Graafian or ovarian vesicles experience considerable changes during menstruation, conception, and after impregnation. The investigations of Gendrin, Negrier, Pouchet, Raciborski, Jones, Lee, Patterson, Bischoff, and several others, have led to the belief, which has been general among medical men, that the phenomena of menstruation is owing to the development or maturity of these vesicles. Until the period of puberty these ovisacs are hardly discernible, but on the completion of this period, they develop themselves, maturing periodically, in women once in every twenty-eight days. At each period of ovulation or menstruation, a vesicle becomes much enlarged, its upper segment rapidly rises above the surface of the ovary, forming a prominence there about the size of a small nut (A, *Fig. 24*), and the walls of the vesicle become less transparent in consequence of the thickness of the internal membrane, and the hemorrhage that finally takes place in the interior of the vesicle. The quantity of blood effused within the vesicle adding to the amount of fluid it naturally holds, distends it so much as eventually to lacerate or rupture its walls, at a point about a line in extent, the situation of which can be distinguished by its reddish appearance and its more elevated projection. The ovum and contents of the vesicle escape into the peritoneal cavity, or are carried down to the womb by the Fallopian tube: the vesicular walls shrink up, their cavity holding a clot of blood

about as large as a cherry, which has oozed from the torn margins,

FIG. 24

DIAGRAM SHOWING THE OVARY, AND A GRAAFIAN VESICLE AT ITS HIGHEST DEGREE OF DEVELOPMENT, AND JUST BEFORE ITS RUPTURE.

A. The hypertrophied Vesicle.
B C C. Radiated cicatrices left by previously ruptured Vesicles.

and which, as the vesicular cavity diminishes, is gradually absorbed. The margins of the fissure approximate, giving rise to more or less cicatricula of various forms, being sometimes linear, again radiated, and at others triangular; when recent, they are red, but gradually become brown, forming deep furrows by their retraction.

This rupture of the vesicles not only takes place at the period of impregnation, but also at each period of ovulation; and the scars which are left, instead of being an evidence of so many previous conceptions, as was formerly supposed, are merely the remains of ruptured ovisacs. (See *Nidation*.)

CHAPTER XI.

OF THE CORPUS LUTEUM.

THE term CORPUS LUTEUM, or *yellow body*, is applied to the remains of the Graafian vesicle, after the ovum has been expelled from it, whether from copulation or from menstruation. And as there has been considerable discussion upon this body, regarding its presence as a sign of conception, it becomes a matter of some moment, in a medico-legal point of view, to determine its true character.

The corpus luteum is a peculiar glandular mass, varying in size from that of a pea to half an inch in length; it is of a dull yellow color, friable in consistence, having a lobulated appearance, with slight convolutions, somewhat resembling a section of the human kidney, and very vascular; according to Montgomery, an injection through the spermatic artery will easily pass into its substance. The *true corpus luteum* is found in the ovary of a recently pregnant woman, and varies in size and appearance according to the period of gestation,

gradually diminishing in size, and losing its deep yellow color, until about the fifth month after full term, when it disappears, leaving a small pit over the place it had previously occupied. So that the idea that it is a permanent formation is erroneous. Dr. Montgomery, who has bestowed considerable attention to this subject, thus speaks of its appearance:

"Its center exhibits either a cavity, or a radiated or branching white line, according to the period at which the examination is made; if within the first three or four months after conception, we shall, I believe, always find the cavity still existing, and of such a size as to be capable of containing a grain of wheat at least, and very often of a greater dimension; this cavity is surrounded by a strong white cyst; and, as gestation proceeds, the opposite parts of this cyst approximate, and at length close together, by which the cavity is completely obliterated, and in its place there remains an irregular white line, whose form is best expressed by calling it radiated or stelliform. This is visible as long as any distinct trace of the corpus luteum remains. I am unable to state exactly at what period the central cavity disappears or closes up, to form the stellated line. I think I have invariably found it existing up to the end of the fourth month. I have one specimen, in which it was closed in the fifth month, and another in which it was open in the sixth—later than this I have never found it.

"After the period of gestation has been completed, or the contents of the uterus prematurely expelled, so that gestation ceases, the *corpus luteum* soon begins to exhibit a very decided alteration in all its characters, until, at length, it is no longer to be found in the ovary. The exact period of its total disappearance I am unable to state; but I have found it distinctly visible, so late as at the end of five months after delivery at the full time; but not beyond this period; and the *corpus luteum* of a preceding conception is never to be found along with that of a more recent, when gestation has arrived at its full term; but in cases of miscarriage, repeated at short intervals, it may.

"At the time of delivery the corpus luteum is neither so large nor so vascular as at the earlier periods of pregnancy, except the woman should happen, at the time of her death, to be laboring under inflammation of the uterine system; in which case the corpus luteum partakes of the turgescence of the other parts, and, very remarkably, of their increased vascularity, a striking instance of which is represented in a preparation in the writer's museum, taken from the body of a woman who died of inflammation of the womb, two days after delivery; the central radiated white line is very distinct, and the vessels having been

injected, the substance of the corpus luteum is quite crimsoned, and, externally, the ovary continues to exhibit the superficial cicatrix, and the alteration of form produced by the projection of the part containing the corpus luteum."

With reference to the corpus luteum, as a test of conception, there is some diversity of opinion; some viewing the existence of a true corpus luteum, so called, as an infallible test; while others maintain that no real distinction can be made between true and false corpora lutea, or that which forms independent of impregnation. This question still remains unsettled, though the observations of Dr. Montgomery, which are corroborated by other investigators, as Haller, Pouchet, Haighton, Jones, Lee, Raciborski, etc., seem to confirm the former view; he remarks: "I have seen many of these virgin *corpora lutea*, as they are unhappily called, and have preserved several specimens of them; but not in any one instance did they present what I should regard as even an approach to the assemblage of characters belonging to the true corpus luteum, the result of impregnation, from which they differ in all the following particulars:

"1. There is no prominence or enlargement of the ovary over them.

"2. The external cicatrix is almost always wanting.

"3. There are often several of them found in both ovaries, especially in subjects who have died of tubercular disease, such as phthisis, in which case they appear to be merely depositions of tubercle, and are frequently without any discoverable connection with the Graafian vesicles.

"4. They present no trace whatever of vessels in their substance, of which they are in fact entirely destitute, and of course can not be injected.

"5. Their texture is sometimes so infirm that it seems to be merely the remains of a coagulum, and at others appears fibro-cellular, like that of the internal structure of the ovary; but never presents the soft, rich, lobulated, and regularly glandular appearance which Hunter meant to express, when he described them as 'tender and friable, like glandular flesh.'

"6. In form they are often triangular or square, or of some figure bounded by straight lines.

"7. They never present either the central cavity or the radiated or stelliform white line which results from its closure.

"This latter peculiarity, in common with several others observable in these spurious productions (whether occurring in virgins or in other women, but not the result of conception), even when they are connected

with a Graafian vesicle, depends on their different mode of formation; a circumstance which deserves especial attention, as pointing out the essential difference between a very large class of these pseudo-structures and the true ones.

"The history of their formation appears to me to be this: accidental or morbid determination takes place toward a vesicle, in consequence of which it is distended with fluid, and either bursts and discharges its contents (in which case there may be found an external cicatrix), or the fluid is again absorbed; but, in either case, there is often deposited on the internal surface of the vesicle, a substance somewhat resembling the *corpus luteum* in color, but in general not more than about one-sixteenth of an inch in thickness, and entirely destitute of blood-vessels: sometimes it is very much thinner even than this, amounting to little more than a mere layer of coloring matter lining the vesicle. In this condition I have often found them, the vesicle being enlarged to three or four times its natural size, full of fluid, and its internal surface of a bright yellow color; but when the vesicle collapses, either in consequence of rupture of its coats, or the absorption of the contained fluid, the inner surface of this new deposit closes upon itself, and forms an irregular line of junction, which is generally darker than the rest of the structure, and not unfrequently, they present the yellow color only on the circumference, while their center is so dark as to be almost black; but, from their situation, they are entirely without lining membrane, to form either a central cavity or white stellated line, which, in the true *corpus luteum*, is formed by the closure of the inner coat of the vesicle; for the same reason also, these accidental formations are in general much smaller than the others; and they are moreover totally without vessels in their structure, so, that, however minutely the rest of the ovary may be pervaded by fine injection, not a particle of it will pass into the bodies thus formed."

Among those who have not considered it as a test of conception, but only as an evidence of perfect ovulation, may be named Hume, Blumenbach, Bischoff, Cuvier, Cazeaux, Prof. Meigs, of Philadelphia, etc. This latter gentleman, in his "Treatise on Obstetrics," maintains that the yellow matter found in a corpus luteum, "is of the same apparent structure, form, color, odor, coagulability, and refractive power," as the yelk of eggs. His views are based upon the following observations:

"1. Equal masses of yelk and corpus luteum are equally yellow.

"2. They alike fill the tube, before the focus is got, with a brilliant yellow light.

"3. They alike consist of pellucid fluid, in which float granules, corpuscles containing yellow fluid, oil-globules, and punctiform bodies.

"4. These bodies, placed on the same platine, and diligently compared together, exhibit the same forms, size, tint, and refractive power.

"5. Yelk, boiled hard, is granular and friable; it is coagulated by heat.

"6. Corpus luteum, boiled, becomes hard, granular, and friable; it is coagulated by heat.

"7. Both substances, raw or boiled, stain paper alike of a yellow color.

"8. There is this difference: the crushed mass of corpus luteum contains patches of laminar cellular tela, detritus, and blood-disks forced out by the compressorium; which can not occur in the yelk, as that is contained within a vitellary membrane, in which its corpuscles are free; whereas, in the corpus luteum, they are confined by the delicate cellular substance lying betwixt the concentric laminæ of the Graafian follicle.

"9. They refract alike.

"10. Projected on a live coal, they alike give out the odor of roasted eggs."

These opinions require further investigation, in order to establish their correctness.

The formation of the true corpus luteum, is thus explained by Ramsbotham: "It has been demonstrated that the Graafian vesicle possesses two membranes: one adhering to the substance of the ovary, the other inclosing the fluid in which the ovule of Baer floats. When a fruitful connection takes place, a great determination of blood is made to that ovary which supplies the germ. The gland becomes larger, rounder, and more vascular than the other; to the touch it feels fuller and softer. But the vascularity is confined to one spot—the neighborhood of the corpus luteum; and the increased size and softness result, not so much from an alteration in the structure of the whole organ, as from the quantity of lymph and fluid blood deposited between the membranes of the vesicle, which is converted into the characteristic yellow gland-like mass. This effusion causes the vessel to be thrown prominently out toward the peritoneal surface; the attenuated coats burst, or rather an opening is formed by

absorption, and the fluid, with the ovule previously contained within them, passes into the tube."

The changes that occur in the ovisac take place with less intensity when impregnation is not present, and hence the difference in the appearance between the true and false corpora lutea. When impregnation has taken place, there is increased vascular excitement in the ovaries and uterus; and from the augmented accumulation of blood in the generative parts, the changes in the ovisac occur with more sluggishness, because they are "conducted upon a larger scale and with a greater abundance of materials."

Leishman, in his *System of Midwifery*, closes a very able article on this subject as follows:

"What is called the Corpus Luteum is due to a deposit of yellow fatty matter in, and hypertrophy of, the internal layer of the Graafian vesicle (ovisac).

"The formation of a corpus luteum always succeeds the rupture of a Graafian vesicle.

"Up to a certain point the changes in the Graafian vesicle are uniform, and have no relation to pregnancy. The corpus luteum of pregnancy may, however, be distinguished in its subsequent course by its higher development and longer duration, its hardness, its vascularity, and, at a later stage, by the formation of the white lining membrane, and large central stellate cicatrix.

"The presence in the ovary of a corpus luteum is no evidence of pregnancy, unless the characteristics last indicated are distinct and unequivocal—under which circumstance it is a certain sign.

"With reference to the above conclusions, it may be remarked that much confusion has arisen from the employment loosely of the terms 'true' and 'false,' as applied to the corpus luteum, in so far as they are assumed to imply a distinction, which proves or disproves the occurrence of pregnancy.

"'There is as little reason,' says Farre, with justifiable emphasis, 'for the use of the last term as there would be for denominating a child a false man. . . . These terms actually represent the same body, only in different stages of growth or decay.'

"During the whole of the child-bearing period of a woman's life, the ripening and dehiscence of the Graafian vesicles are of periodic occurrence. In those animals in which plural births are the rule, several vesicles ripen and discharge their contents at, or near, the same time; but in man this is exceptional, and we thus find that one vesicle

only, as a rule, ripens at a time, bursts, discharges its contents, and rapidly shrinks as it retires toward the centre of the ovary, to give place, in a normal condition of the parts, to a constant succession of vesicles, which, one by one, run a similar course after discharging their ova. There is every reason to believe, further, that, during pregnancy and suckling, while the uterine functions are in abeyance, those also of the ovary are temporarily arrested, in so far as the development of new Graafian vesicles is concerned—the whole generative force being, as it were, turned into other channels.

“The numerous lacerations which, in consequence of repeated ruptures, take place on the surface of the ovary, leave, in the process of healing, corresponding cicatrices. On this account, the smoothness of surface is soon lost, and it becomes more and more fissured and wrinkled, until, toward the end of the child-bearing epoch in a woman's life, the ovary is so irregular on the surface, as to warrant the comparison which Raciborski has instituted between it and the kernel of a peach. After this, the organ becomes atrophied, and, like the uterus and other parts, is restored, in some measure, to the form which it presented in early life.”

The medical expert, if called upon to determine the *existence* or *non-existence* of pregnancy, by the appearance of the corpus luteum in a post-mortem examination, would undoubtedly find an extremely difficult question to decide. Every author cites numerous differential characteristics, which I believe to be misleading; also impossible to diagnose pregnancy, beyond the peradventure of doubt, simply by the appearance of the corpus luteum.

CHAPTER XII.

THEORIES OF IMPREGNATION.

GENERATION comprises those several phenomena which are necessary to the development or reproduction of organized bodies, and which include, in the human family, the various functions of *menstruation*, *copulation*, *conception*, *gestation*, and *labor* or *parturition*. The particular method by which generation is effected in the organic world, varies according to the character of the organization, being more sim-

ple as this approaches elementarity. Moreau has described the several modes somewhat as follows:

1. Generation may be spontaneous, doubtful or unknown, as in case of intestinal worms.

2. It may result from an individual, by division or separation of its parts; *a*, by simple division of the individual, each fragment producing a new individual, as in the instances of *fissiparæ* or vegetables, cuttings of trees, and animal infusoria; *b*, by separation of a vegetable product, either on the exterior or interior of the individual, as with the *gemmae*, or vegetables, buds of trees, and some polypi.

3. It may be effected by impregnation, requiring the connection of the sexes, and varies according to the character of the sexes. 1st. As in hermaphroditism, or where the sexes are united in the same individual, and which may be divided into, *a*, where the sexes are united in a common envelope, in which instance one individual is sufficient, as with many vegetables and some mollusca; *b*, where the sexes are separated on the same individual, as in monœcious plants; *c*, with the sexes separated in the same individual, but requiring the connection of two similar individuals, and even reciprocal impregnation, as with gasteropodous mollusca, and worms. 2d. When the sexes are separated on different individuals, and which may be divided into, *a*, without approximation, the parents and offspring remaining unknown to each other, as with dicecious plants, and fishes; *b*, with approximation, but without copulation, the parents knowing each other, but the offspring being ignorant of them, as with the batrachia, or reptiles, frogs, toads, etc.; *c*, with approximation and copulation, as with the majority of insects; the reptilia, chelonia, sauria, ophidia, birds, and mammalia.

4. This last method of generation by copulation and approximation, offers great varieties, differing according to the mode of development of the fecundated product, thus: *a*, by incubation, as with insects, and the greater part of reptiles and fishes; *b*, by external incubation, as with birds; *c*, by internal incubation in the parts of the mother, without adhering to them, as with some of the ophidian, and ovoviviparous animals; *d*, by an organ of gestation, to which the impregnated product adheres, from which it derives the greater part of its nourishment, and from which it separates after a certain time, as with all the mammiferous animals. To this last and most complicated process belongs the generation of man.

The mode in which fecundation is accomplished in the human being belongs more especially to the physiologist's department to determine;

but as the matter has long been a subject of inquiry, and presents a field of interest to many, I will briefly refer to the various opinions that have from time to time been advanced and maintained in the medical world.

In the male, the semen, or spermatic fluid secreted by the testicles, is undoubtedly the agent especially called into action in the function of reproduction; this is manifest from the fact that, removal of the testes not only destroys all sexual propensity, but likewise renders the individual forever after incapable of begetting offspring. The same may be said in relation to the removal of the ovaries of the female; she loses all sexual inclination, the procreative functions are annihilated, and all those graces, emotions, and feelings which distinguish the sex, gradually disappear. Observations have likewise been made in relation to this matter, of a highly interesting character, to some of which a very concise reference will here be made.

Spallanzani, during his investigations, noticed, that as soon as the female frog laid an egg, the male immediately cast a fluid upon it, which soon impregnated it. He then confined the genitals of the male frog in a silk bag, and ascertained that in this condition impregnation could not occur. He, likewise, applied to some of the freshly laid ova, a small quantity of the male semen or fluid which he had previously collected, and impregnation was the result. He also instituted similar experiments on a bitch in heat, and which had been kept confined for twenty-three days before heat commenced, in order to prevent the approach of any dog; the result was, that by injecting nineteen grains of semen into the vagina, at 100° Fah., fecundation followed, and, at the proper period, the animal gave birth to three pups which bore a strong resemblance to herself and the dog from which the semen was gathered. Prevost and Dumas arrived at similar results; they expressed the semen from the testicle of a frog, and after diluting it with water, they placed some ova upon it, which became prolific. According to these gentlemen, it is important to dilute the male fluid in order to have the experiment prove successful.

Sir Everard Home, in his "Lectures on Comparative Anatomy," vol. iii, p. 315, records a similar experiment on man, performed by Hunter; the husband was affected with hypospadias, which prevented him from impregnating his wife; Hunter advised him to inject his semen into his wife's vagina through a warm syringe; the result was, she became pregnant.

These experiments, with others of similar character, prove conclu-

sively, that the agents engaged in the generating process, are the semen furnished by the male testes, and the ova of the female. Spallanzani, as well as Prevost and Dumas, determined from further and satisfactory trial, that the fructification of the ova only took place when brought into actual contact with the male semen; thus refuting the doctrine held by some physiologists, that impregnation did not require this mutual junction, but was effected merely by the presence or influence of a seminal halitus or vapor.

Another point of inquiry among physiologists, was, the method by which the spermatic fluid is carried to the ovaries; some contending that impregnation was effected in the uterus, while others maintained that the semen was conducted to the ovaries, and that fecundation was possible even beyond the angles of the uterus; indeed, this fluid has been found on the surface of the ovaries, by Adelon, Bischoff, and other investigators. But by what means it reaches the ovaries, has never yet been satisfactorily explained; for the male penis, certainly has not sufficient power to throw it beyond the uterus.

Various views have likewise been supported at different periods, relative to the manner in which the union of the male and female principles necessary to the formation of a new being, is effected, and how this new being, of whatever species, comes to bear the impress of the mental and physical features of one or both parents. But the solution of these particulars is still involved in mystery. The oldest theory on this subject, is that of *epigenesis*, which holds that the new being is created entirely anew, and at the moment of conception, receives at once the materials necessary for its formation, one portion being derived from the testes of the male parent, the other from the uterus or ovaries of the female. Aristotle, Galen, and others, supposed that the material furnished by the female was the menstrual fluid; and Hippocrates considered that the female supplied all the substance required for the development of the future being, while the male fluid merely contained that vivifying principle necessary to impart vitality to the female materials. This theory of epigenesis, with various modifications, was the prevailing one for many years, and was for a time renewed by Buffon in the beginning of the seventeenth century, whose views were entirely speculative and untenable. His notion was, that the growth and nourishment of individuals during youth, was effected by certain organic molecules common to both sexes; but which being required in less quantities for these purposes at maturity, the predominance was emitted by the male testes with the

spermatic fluid, and also by the ovaries, or female testes, as he termed them, for the purposes of reproduction of the species. He imagined that the body of each parent supplied each of these molecules with atoms derived from its various parts, and that whichever parent afforded to the newly organized being the major portion of these molecules, the resemblance to that parent would be the most marked.

During the sixteenth century another theory was originated, being based upon investigations and discoveries of the physiologists of that period, among whom may be named, Leuwenhoeck, Harvey, De Graaf, and others. It is termed the theory of *evolution*; and was strenuously supported under some form or other, during the whole of this century. The adherents of this theory maintained that the germ of the new being existed in only one of the parents, while the other furnished the principle which communicated life to it. They were divided into ovarists, and animalculists or spermatists. The ovarists, among whom I may mention Harvey as the principal, having discovered numerous small vesicles in the ovaries, which apparently decrease according to the number of conceptions, held that these vesicles were the fetal germ, which only needed the animating power of the male semen to usher the new being into existence. But this view was objected to by many, on account of its exclusiveness, whereby the male fluid had but a minor part to perform; beside which, if the semen merely exerted a vivifying influence upon these vesicles, it did not explain why the offspring so often resembled its male parent.

In consequence of these objections, a different opinion was supported by those who were called animalculists, and which originated principally from the microscopic discoveries of Leuwenhoeck and other investigators, who found myriads of animalcules in the male semen. These held, that after having been thrown into the uterus during copulation, the animalcules perished, with the exception of one or two, which entering the Fallopian tubes, were conveyed through to the ovaries, and there deposited and nourished in a nidus formed by the ovum. As this spermatozoid progressed in growth, it ruptured the nidus which inclosed it, and was again conveyed to the uterus to be nourished and preserved until the period of parturition. To this view, wherein the female merely supplies the nourishment for the embryo furnished by the male, an objection similar to the one above is suggested, as to the cause of resemblance, in many instances, to the female parent.

Those who desire to have these several views more in detail, are

referred to the several physiological treatises in which they are fully related and discussed; and as they have become at the present day obsolete, a mere glance at them was deemed all-sufficient in the present work. But, before terminating this subject, a reference to the views of physiologists of the present day must be made, without which, this portion of our work would be imperfect.

In Chapter X, will be found a description of the ovaries, Graafian vesicle, ovule, germinal spot, etc.; these are the discoveries of recent physiological investigators, and have been the means of effecting a revolution in relation to the views of impregnation, giving rise to a *theory, the ovular theory*, which is, undoubtedly, more in proximity to the truth, than any of the previous doctrines which have been held on this subject. The theory is, that the egg, ovum or germ, is supplied by the female, in whom it exists in indeterminate quantities; that at the age of puberty, these germs commence maturing; at their period of ripening, they rupture the vesicular tissue in which they are contained and pass from it, being accompanied by a sanguineous discharge, probably from the uterus, called menstruation, the appearance of which is significant of the fact, that the female has reached the age at which she is capable of giving birth to children; these ovules escape either into the peritoneal cavity, or into the womb through the Fallopian tubes, and pass off with the menstrual flow, or are retained in consequence of fecundation.

On the other hand, the male supplies a fluid in which is contained minute, round and granulated bodies, *the spermatic granules*, as well as bodies possessed of motion, like the epithelial cells, which are not, however, animalcules, but, more properly, spermzoons or spermatozoids; these bodies, by means of *ciliary movement*, the result of wavy motion of the ciliated epithelium lining the walls of the uterus and of the Fallopian tube, assisted perhaps by a kind of peristaltic action of the latter, are conveyed to the uterus, tubes, or ovaries, when coming into contact with the nude, uncovered ovum—wherever this may be, in the ovary, the tube, or the uterus—through some inscrutable agency, probably an intermingling or mutual permeation of the male semen and female germ, animalization takes place; and a creature is brought into existence, which, possessing certain elements derived from each parent, will, necessarily, present mental and physical resemblances to either or both of them. Ovarian and ventral pregnancy prove that the spermzoons are conveyed even to the ovary; but impregnation undoubtedly occurs in the tube or in the uterus—after the ovum has left its ovarian vesicle.

How long a period is occupied between the emission of the ovum from the ovary and its entrance into the uterine cavity is unknown, probably five or six days.

Repeated experiments on animals have proved, that any obstacle to this contact of the germ and semen, will prevent conception. Martin, Barry, Bischoff, and others have observed the spermzoons freely moving about in the transparent zone of recently impregnated ova of animals, and it is by no means improbable that a similar result occurs in impregnation of human ova.

CHAPTER XIII.

MENSTRUATION—OVULATION—CONCEPTION.

AT a certain age, the female reaches the period of puberty, which is made manifest by a sanguineous discharge from the uterus, occurring periodically once a month, and which is called menstruation. It has likewise many other names applied to it—as *menses*, *catamenia*, *courses*, *terms*, *periods*, *monthly sickness*, *menstrua*, *flowers*, *monthlies*, *times*, etc. It is not a secretion, but an effusion or hemorrhage, very much resembling venous blood, and is undoubtedly blood rendered impure by the addition of mucus and epithelial scales with which it meets during its flow.

Stricker, of Vienna, "has demonstrated the passage of red and white blood corpuscles, through the walls of the capillaries of the uterine mucous membrane. Some of these capillaries become ruptured in the process. The blood oozes through the mucous membrane of the uterine cavity, impregnates its epithelium, causing it to swell and become detached, and passes on, mixed with epithelial debris; into the vagina, and thence out of the body."

As a general rule, the discharge, in females of this climate, is established at the fourteenth or fifteenth year, though it varies with some, oftentimes appearing as early as the twelfth or thirteenth year, and again not until the seventeenth or eighteenth. In the former instance, it is termed *precocious menstruation*, and is significant of an unnatural increase or development of certain organs, at the expense of others; it is commonly followed by premature death, especially if an early marriage, resulting in pregnancy, should take place, in consequence of

these unseasonable and abnormal indications of puberty. In the latter instance, the term *tardy menstruation* is applied, and which is usually the result of some debility or disease, that may eventually destroy the female.

Climate, constitution, education, modes of life, etc., affect the appearance of this discharge; it being earlier in warm climates than in cold, and in city females, than in those of the country. It likewise appears earlier and more abundantly in females of a nervous temperament, than in those who are phlegmatic.

The advent of the menstrual discharge, is the chief external sign of the approach of puberty; and is one of the most interesting periods in the life of the female. At this time, a Graafian vesicle for the first time projects from the surface of the ovary, gradually developing to a state of complete maturity, the maturation of which marks an important epoch in the life of the female—a transformation in which the girl passes into womanhood and becomes capable of reproduction, a process attended by growth and development of the peculiar organism of the female—by which a new life and individuality assert themselves. Thus ovulation is established, which, at puberty, is usually concurrent with menstruation, and is probably the immediate or exciting cause of menstruation; however, as will be seen presently, the two may exist independently of one another. This interesting period, in the life of the female, is ushered in by many symptoms and changes in her mental and physical developments that manifest themselves gradually. A remarkable advancement toward the perfection of the reproductive organs is presented; the ovaries rapidly enlarge, and change from their previous long, flat, and smooth condition, to one in which they are large, oval, rounded, and embossed; the Fallopian tubes become elongated, their fimbriated extremities widened, and the fimbriæ enlarged; the uterus becomes more fully supplied with blood, and its tissue more florid; the body and fundus likewise obtain more rotundity and development than the cervix, which appears proportionally shorter and narrower; the vagina is widened and dilated, and its vascular structure is supplied with increased quantities of blood, and its mucous folds augmented in number. The pelvis becomes larger and wider, with a diminution of its inclination forward; the pubic region more prominent, round and covered with hair; the labia pudendi more amplified, red, and sensitive; the hips more projecting, and inclined outwardly; the pelvic cavity enlarged; and the breasts rounder, full, and prominent, with the nipples projecting, more sensitive, and the areola of a darker

hue. The whole person improves in grace and elegance, and the voice becomes more sonorous and melodious.

Corresponding with these modifications of the physical system, are, changes in the mental character; the gay, light-hearted girl loses her playfulness, and assumes the dignity of womanhood; she becomes more reserved, more sensitive, and full of sympathy; she manifests strong attractive feelings toward the opposite sex, and seeks to love, as well as to be loved; the social and moral sentiments become of a purer and more exalted character; a great fondness for children is displayed; and in her, we find the most perfect combination of modesty, devotion, patience, affection, gratitude, loveliness, and Christian virtue.

The menstrual discharge, being a sign of maturity and fertility of the reproductive organs, does not appear during childhood, nor in old age. It usually ceases at the ages of from forty to fifty, though occasionally, it extends to a very advanced age. The period of its cessation is termed the *turn of life*, the *menopause*, or the *critical time of life*; from which time, women cease to bear children. And on account of the various unpleasant, and often serious symptoms presenting at this period, its approach is much dreaded by nearly all of them.

The amount of fluid discharged, varies in females, averaging from six to eight ounces; some will lose only four ounces at each menstruation, and others twelve, and yet each will remain in health, because the system of each is controlled and affected according to its individual wants, habits, strength, and activity. The discharge usually continues from three to six days, occasionally from eight to ten, and must, as a general rule, have revealed itself before impregnation can take place.

All cleanly women wear a napkin during menstruation, which is placed, by means of a girdle, in a manner similar to a T bandage, for the purpose of concealing their situation, which it does by absorbing the fluid discharged; from four to twenty of these napkins will be worn during one menstrual term.

In the consideration of menstruation and ovulation, many strange theories have been advanced, that appear quite absurd in the light of modern research; some authors use the terms synonymously. Physiological investigation, however, gave rise to such inquiries as: What is the cause of menstruation? From whence comes the hemorrhage? To what extent does menstruation depend on ovulation? Is the animal rut, or oestrus, and menstruation, analogous? And many other questions that we need not notice here.

Menstruation is believed by many to be merely the phenomenon of that function which matures and discharges an ovum from the ovary periodically. The prevailing belief seems to be, that menstruation is co-existent with, or rather the result of, functional ovarian activity; that menstruation is an indication of ovulation. That ovulation occurred only at the menstrual period, was generally accepted as a fact, until within a few years. It is a special function, and consequently may occur independently of menstruation; causes, of which we know nothing, may hasten the development of a vesicle, or excite the bringing forth of an immature ovum, and thus establish—inter-menstrual ovulation.

The Jewish female furnishes, it seems, evidence indicating the occurrence of inter-menstrual ovulation. According to Rabbinical ruling, intercourse is prohibited until twelve days after the appearance of menstruation; at the expiration of this time, the bath of purification is taken, the Jewess scrupulously cleansing herself—every part of the body being immersed in the bath. Mosaic law has named this the *Mieva*. Not until now, does the wife receive the husband. These women are surely as prolific as other females, and their impregnation demonstrates the fact, that the maturation of the ova occurs at any time.

A Graafian vesicle may rupture during sexual excitement, as during coitus, or from the sequence of such excitement; and this is an explanation why women may conceive at any time. That ova are discharged at irregular periods from the ovaries, and not merely monthly, about the menstruating period; that there can be no menstruation except in connection with ovulation, though there may be ovulation without menstruation, is now becoming the opinion of obstetricians in general.

Mr. Lawson Tait says: "The growth and ripening of Graafian follicles before puberty constitutes one of the many arguments in favor of the view, that menstruation and ovulation are wholly distinct processes, and abundant examples can be given of them being carried on each independently of the other. The statement constantly made in text-books that, if the ovaries are extirpated, or become atrophied, menstruation does not re-appear, is not accurate; and equally incorrect is the assertion that the first ovular dehiscence corresponds with the first appearance of the menses. It is perfectly certain, that ovulation is by no means a periodic process, in the sense of being monthly; and the fact that a periodic flow from the uterus is almost confined to the human race, is sufficient to show, that it is not in the ovaries that we

have to look for the cause of this curious and objectionable phenomenon, for which Johnson alone has so far suggested a useful purpose. Where the cause does exist, we do not know; but it is quite certain, that, as it continues for months, in some cases, after the removal of both ovaries, it can not be in those glands. Nor is it in the uterus; for in three cases in which I have removed the uterus, as completely as it can be done, menstruation has persisted ever since—in one of them for nearly seven years. Removal of the ovaries alone, is followed by immediate and complete arrest of menstruation in about fifty per cent. of the cases. Removal of both tubes, with or without the ovaries, is followed by the same arrest in about ninety per cent. of the cases; and I suppose that in hysterectomy the arrest occurs in at least ninety-seven per cent. But it is the exceptions, in such a case as this, which prove the rule; and I suppose that we shall some day find a special nerve mechanism which is the real cause and governor of the phenomena of menstruation; and this is certain to be ganglionic; for a ganglionic system governs all other rhythmic phenomena.”

As to the source of the menstrual discharge, strange and varied theories have been advanced. The most recent is that of Dr. A. W. Johnstone, to which Mr. Tait calls attention in his work on *Diseases of Women and Abdominal Surgery*—viz: that it depends on the action of a special nerve, which lies in the broad ligament, in the angle between the tube and round ligament, close to the uterus. Some claim it has its origin in the cervix and os uteri; others in the vagina, tubes and ovaries.

Coste believed it to be a transudation through the walls of the capillary vessels of the uterus, being chiefly venous. Dr. Farre advances the theory, that there may be permanent vascular orifices through which the blood escapes during the menstrual period; that these orifices are closed during the inter-menstrual period, by the contractility of the tissue surrounding them.

Pouchet claimed, that the greatest part of the mucous membrane is shed at each menstrual period; its separation from the uterine walls involved a rupture of vessels, and thus the menstrual flow. The most reasonable theory, however, is, that the tubes are the starting point of the catamenial discharge; that the epithelial lining and a portion of the uterine mucous add to the detritus, the blood being largely from the uterine walls, the result of a process of diapedesis. A case of chronic inversion of the uterus was recently reported before the Cincinnati Eclectic Medical Society, in which this condition was clearly

illustrated. Menstruation has occurred regularly for many years; at each period the mucous surface of the inverted uterus is bathed in blood, prior to which many drops of blood, giving it a beaded appearance, are noticeable; also the loosening and casting off of small shreds of the epidermis—the cause of the hemorrhage.

The fact of menstruation occurring after the removal of the uterus and its appendages, may be due to segments of the organs left at the pedicle, either in hysterectomy or oöphorectomy, or, perhaps, to the existence of a supernumerary ovary.

Since the female among the lower animals will not cohabit with the male at any period other than the rutting season, it would indicate that the oestrus and ovulation are concurrent. I am aware, that doubts are entertained by some, as to whether the oestrus and human menstruation are analogous; however, admitting that they are, this would not be positive proof but that ovulation may exist irregularly and independently of the rut.

By ovulation, is understood the functional action of the ovaries: at which time occurs the escape of the ovum from the ovisac, from whence it is either received by the Fallopian tube and transmitted to the uterus, or is lost in the peritoneal cavity. The fluid contents of the ovisac gradually increase with its development, until, at the time of complete maturation, the distention is so marked that rupture is the result, followed by the dehiscence of the ovum. The functional relation existing between the oviduct and the ovary, and the exact manner by which the ovum, as it escapes from the ovisac, finds lodgment in the oviduct through its fimbriated extremity—*morsus diaboli*—and is then conveyed to the uterus, does not appear to be clearly defined. Numerous opinions have been advanced as the subject has been studied and investigated. Lusk, in his *Science and Art of Midwifery*, speaks as follows, on the MIGRATION OF THE OVUM:

“The number of ova in each ovary has been estimated by Henle at thirty-six thousand. Only a small proportion of them, however, meet with the conditions requisite for fruition. It is probable, that many ova perish while still surrounded by the stroma of the ovary. The history of extra-uterine pregnancies teaches us that, in some instances at least, the ovum, after its discharge from the Graafian follicle, escapes into the abdominal cavity. It, therefore, becomes an interesting subject of inquiry as to the conditions which ordinarily determine the passage of the ovum from the ovary into the Fallopian tube of the corresponding side. It will not do to assume, as is usual, a peculiar erectility of

the Fallopian tube, which enables it to apply its funnel-shaped extremity to the ovary just at the moment of the rupture of the Graafian follicle. Setting aside the inherent improbability of the existence of such a degree of intelligence in the fimbriæ as would lead to the exact adaptation of the tube to the precise point at which the ovum is to be discharged, it has been proved that the Fallopian tube possesses none of the characteristics of erectile tissue. Injections of its vessels after death do not communicate to it the slightest change of form or place.

“Muscular action has also been often invoked to explain the assumed manner in which the fimbriæ seize the ovary; but galvanization of the tubes, practiced upon criminals recently executed, produces only vermicular contractions, which do not affect the position of the fimbriæ. Indeed, when we remember the position of the Fallopian tubes in the pelvis, and bear in mind that they are at all times necessarily subjected to the pressure of the intestines, it becomes difficult to understand how they can execute any very extended movements.

“In the absence of direct experimental proof, the suggestion of Henle, that the passage of the ovum into the Fallopian tube is due to currents produced in the serum by the ciliated epithelium, which covers both the external and internal surfaces of the fimbriæ, is, on the score of probability, entitled to the most consideration. One of the fimbriæ (*fimbria ovarica*) is permanently attached to the lower angle of the ovary.

“It is likely that the ovum, discharged from a Graafian follicle, is floated down by the peritoneal serum toward the lower and outer border of the ovary, where a sufficient current is present to insure its being caught up and conveyed into the infundibulum tubæ. Failures on the part of the ovum to reach its destination are, in all probability, not uncommon. Support is given to the theory of the importance of the ciliæ in influencing the migration of the ovum by the observation of Thiry, that in batrachians, which have the oviducts fixed to the abdominal walls, and situated at a distance from the ovary; during the rutting period little pathways of ciliated epithelium form in the peritonæum, which collectively converge toward the openings of the tubes.

“While the ovum remains in the ampulla, or dilated portion of the tube, its further progress is at first dependent upon the movements of the ciliæ; but, after the isthmus is reached, an additional propelling force is furnished by the circular muscular fibers, which possess a peristaltic action.”

The attention of physiologists has recently been called to an adenoid

function of the endometrium and subjacent tissue. The cited evidence of secretory power, in the lining of the uterus, is based on the development of the decidual structure, which is always evolved as soon as pregnancy occurs, and which not infrequently developed during normal menstruation. Such a membrane, or vascular meshwork, may be exuded during ovulation—the low grade of structure not depending upon either menstruation or pregnancy. The decidual exudate depends upon exalted vascular activity in the endometrium, and not upon any secretory function. In fact, a membrane or vascular texture can not be secreted any more than a tongue or an ear can be the result of adenoid action.

It has been assumed and asserted by speculative physiologists, that during inter-menstrual periods there is evolved from the endometrium a membranous meshwork, which is to entrap or ensnare the fertilized ovum when it emerges from the Fallopian conduit. If the ovum be not fructified, it is not prevented from traversing the uterine cavity, and falling into the vagina. In other words, the speculative net-work developed from the endometrium is to be *discriminative*—is to let the unfecundated ovum pass the barrier, but to entrap and ensnare the fertilized body. However, to get rid of discriminating power ascribed to the deciduous membrane, the meshwork is to entangle the unimpregnated egg and take it out of the womb, but is to arrest the outward course of the fertilized ovum. An objectionable feature of the scheme is, that the inter-menstrual meshwork is to be denominated *nidus*, a nest, and the entrapping is called *nidation*, or nesting, after the manner of birds; when in fact the uterine exudate is more a net than a nest. The endometrium does secrete mucus by means of crypts and follicles in its free surface, and contributes to the exudative formation of the decidual structure, but it does not develop anything in health except uterine mucus, which, in some respects—in odor, for instance—is peculiar. In a normal condition—between menstrual activities—the endometrium secretes or throws off endothelium, as the mucous lining of the mouth does, or any other localized portion of a mucous structure.

The mucous secretions differ to an appreciable extent. The secretions of the urethra differ from those of the bladder and ureters. The free surface of the endometrium is pale and smooth, except when menstrual epochs are approached; the structure then attains a pinkish flush of vascularity, and at length becomes so congested that corpuscles of blood burst through the alternated walls of the vascular capil-

laries. The corpuscles mix with mucus and exuded lymph, making a fluid which is decidedly sanguineous, but is never pure blood unless a hemorrhage occurs.

Toward the end of a catamenial *nixus*, there is little blood and much plastic lymph exuded, as in ordinary traumatism, and then the decidual exudate or meshwork is elaborated. Lining the fundus of the womb as it does, it can not help ensnaring the ovum as it leaves the salpingian canals, whether the egg be impregnated or not. If the ovum be not fertilized, it passes off with the detached decidua; and if it be fructified, the pregnant state excites uterine vascularity, and secures the services of the decidual membrane in fixing and nourishing the developing ovum. The neoplastic membrane makes no discrimination between the unimpregnated and the fertilized egg, but the condition of pregnancy enforces the kind of action which is to result in a loss of the structure, or in the utilization of its possible offices in the nutrition of the ovum. It has been suggested, that the decidual exudate of menstruation occludes the canal of the uterine cervix, producing mechanical obstruction—membranous dysmenorrhœa; but as catamenial pains are mostly over before the menstrual exudate is shed or cast off, the theory has few substantial facts to sustain it. The womb in a state of physiological hypertrophy—pregnancy—is augmented in weight from ounces to pounds. Yet, in the enlarged state it is increased mostly in muscular evolution; after parturition, the organs enter upon rapid involution, so that in a few weeks it returns to normal weight and size. In the manifestation of these great changes, there is no display of increased glandular action or adenoid activity.

The endometrium undergoes important transformations, yet does not become appreciably glandular or adenoid. In ectopic gestation a decidual exudate is always found upon the free surface of the endometrium, as if ready to ensnare the fertilized ovum, but the function of the membrane is not forced into use.

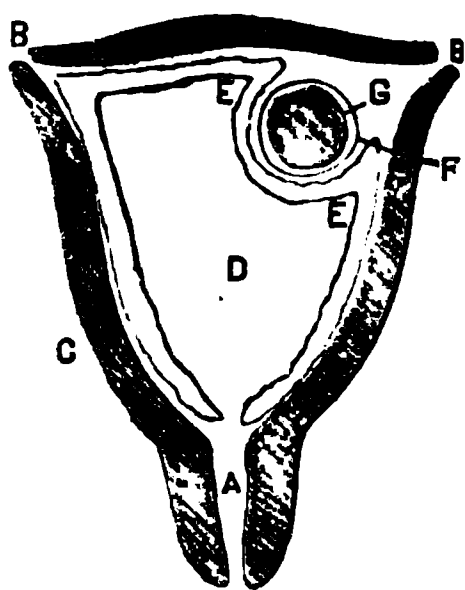
CHAPTER XIV.

DEVELOPMENT OF THE HUMAN OVUM.

It will now be proper to notice those changes which occur, during pregnancy, in the ovum, as it progresses in its development. Shortly after conception, a layer of coagulable lymph lines the whole internal surface of the uterus, which is at first of a soft, gelatinous nature, but which soon becomes imperfectly organized, vascular, and of a reddish color; it is called the *membrana caduca* (caducous membrane), or *membrana decidua* (deciduous membrane). Several other names have been applied to it, as *epichorion* by Chaussier, *epione* by Dutrochet, *perione* by Breschet, *anhistous membrane* by Velpeau, *adventitious lamina* by de Blainville, *nidal decidua* by Aveling, etc. This membrane is about one line in thickness, and is in contact with the whole of the inner uterine surface; its inner, or fetal surface is smooth and polished, with striæ and depressions which lead into canals, bearing some resemblance to that of serous membranes, and its external or uterine surface is rough and unequal, and closely adheres to the internal surface of the uterus. It is not persistent in its character, as it is formed only during conception, or as stated under *nidation*, in the preceding chapter; and it is expelled with the ovum and its membranes whenever this occurs. Within this membrane is a space or cavity called the *cavity of the decidua*, which is filled with a limpid, serous fluid, to which M. Breschet has given the name *hydropерion*. This fluid is present simultaneously with the caducous membrane, or perhaps with the impregnation of the ovum, increases in quantity as the uterus enlarges, and continues to be secreted, according to Breschet, until the *caduca vera* and *caduca reflexa* come in contact with each other, or toward the fourth month; it is supposed that this liquid affords nourishment to the embryo during the early months, before a direct placental communication is established between it and its mother.

The manner by which the ovum becomes enveloped in this membrane is supposed to be as follows: having passed through the Fallopian tube, until it arrives at its uterine orifice, it pushes before it a portion of the *membrana caduca*, until the whole ovum is surrounded and inclosed by this membrane (F. *Fig. 25*). The por-

FIG 25.



**THE CADUCA, AFTER
THE ARRIVAL OF THE O-
VUM INTO THE UTERUS.**

- A. The Cavity of the Uterine Neck.
- B B. Uterine Orifices of the Fallopian Tubes.
- C. External, or Uterine Caduca.
- D. Cavity of the Decidua.
- E E. Angles at which the Decidua Vera is reflected by the advance of the Ovum.
- F. Chorion.
- G. Amnios.

tion of membrane thus covering the ovum, is called the *decidua ovuli*, or *reflexa* (ovuline, or reflected decidua), while that in contact with the uterine walls, is termed the *decidua uteri*, or *vera* (uterine, or true decidua). As the ovum grows, the decidua reflexa approaches nearer and nearer to the decidua vera, the cavity of the decidua diminishes, until, finally, at the third month the cavity is obliterated, and the two decidua, coming in contact, become agglutinated into one membrane. The ovum, it will be seen, is not completely surrounded by the decidua reflexa, and at that part of the uterus from which this membrane was detached by the advancing ovum, the surface is lined by no membrane whatever. At this uncovered point a new structure is developed between it and the ovum, bearing some resemblance to the membrana decidua, and which is called *decidua serotina*, and here the subsequent formation of the placenta takes place. The uses of the membrana caduca, are, according to Moreau, "to prevent the ovum from floating loosely in the cavity of the uterus; to maintain it in contact

with a fixed point of the parietes of this organ, until it has contracted sufficiently numerous and firm attachments to enable the embryo, after being developed during the first stages of pregnancy at the expense of the surrounding fluids, to extract from the blood of the mother, the materials suitable for its nutrition and subsequent growth; to determine the place of insertion, form, and extent of the placenta; to prevent superfetation; and, according to Lobstein, to transmit to the chorion and amnion the vessels which furnish these membranes with the elements of nutrition and exhalation."

The above is the description generally given by authors relative to the caducous membrane; still, it is not a settled question, and much diversity of opinion prevails in regard to it. Some consider it to be a secretion, or exhalation from the internal mucous coat of the uterus, effected by the peculiar excitement resulting from conception; while others view it as an exfoliation of this mucous coat, itself, which, from a similar cause, has undergone considerable changes in its consistence and vascularity. The former is the most commonly received opinion, and, probably, the most correct one; it maintains, that the excitement

caused by a fruitful coition occasions the secretion of a plastic lymph, which coagulates and forms a kind of false membrane or *caduca*, analogous to those produced on inflamed surfaces by the exhalation and coagulation of an albuminous fluid, and which is entirely distinct from the mucous membrane, although it adheres, more or less firmly, to the latter by numerous vascular villi, or prolongations, which frequently extend into the canal of the cervix, or Fallopian tubes. When the adhesion of this false membrane is but slight, the ovum, upon entering the uterine cavity, instead of pushing forward a *decidua reflexa* at the orifice of the tube, may slip between the *caduca* and uterus, and form an attachment at some other point, thus giving rise to the various placental insertions which are met with in practice.

The opposite opinion maintains that the utricular glands of the uterus become elongated, augmented in size, and contorted, their secretion increases, the vessels of the mucous membrane become more fully developed in size and number, and a substance composed of nucleated cells fills up the interfollicular spaces in which the blood-vessels are contained. These changes produce a thickening and softening of the mucous membrane itself, with increased vascularity, thus forming the deciduous membrane. But, as Prof. Meigs observes, "I can not readily comprehend how, after all this structure is once thrown off as a *decidua*, it can ever be reproduced for the service of subsequent pregnancies." Dr. Carpenter inquires, if the views relative to the mucous membrane of the uterus being the *decidua*, are well-founded, how are we to explain the formation of the *decidua* continuously over the upper orifice of the cervix uteri, and over the orifices of the Fallopian tubes, as is frequently, though not always, the case?

Again, it has been asserted by Dr. Lee, that this membrane is not formed unless the ovum reaches the uterus, but in this he is evidently in error, as there are, at least to my mind, a sufficient number of facts recorded to prove its presence independent of the arrival of the ovum at the uterus. And, if I am not mistaken, Prof. Meigs, as well as other investigators, have observed the *decidua* in cases of extra-uterine pregnancy. Moreau states, that "it is even found in cases of tubular and ovarian pregnancy, provided the pregnancy be not too far advanced, and have not exceeded five or six months, for we are inclined to believe that it disappears at a later period." Velpeau denies that the membrane is organized, hence, he has called it *anhistous*; but there are sufficient proofs of its organization, as, for instance, its vascularity; it has also been injected by Ruysch, Burns,

Lobstein, and others—beside, it is liable to disease, and toward the last becomes very thin, like serous or cellular tissue.

Hunter asserted that the deciduous membrane had three openings, one at the inner orifice of the cervix, and one at each orifice of the Fallopian tubes; were this the case, no decidua reflexa would be formed, but the ovum in entering the uterus, would at once pass through the opening into the cavity of the decidua, from whence it could escape out of the uterus through the opening at the inner orifice of the cervix, and no conception would result. Such openings in the membrane may occasionally be present, but according to the investigations of many excellent observers they do not occur as a general rule. It has also been denied that the decidua reflexa is a mere reflected portion of the decidua vera, as the texture of the two are said to be non-identical; and that the reflexa is probably formed by the agency of nucleated cells from the plastic materials thrown out from the decidua vera, in the same manner as the chorion is supposed to be formed in the Fallopian tube, from similar materials secreted from its lining membrane. More recently it has been advanced that the decidua is formed independently of impregnation (*see Nidation*); that it consists of two distinct layers, one, lining the wall of the uterine cavity, and termed, the *decidua vera*, *d. uteri*, or *parietal decidua*, the external surface of which presents numerous filaments, while its internal surface is smooth, shining, but presenting numerous elevations. The other, forms the inner layer, is named the *decidua reflexa*, *d. ovuli*, *d. chorii*, and presents similar elements as the preceding, its internal surface being studded with numerous pits, probably for the reception of the villi of the chorion.*

*From recent investigations by Dr. Kundrat, of Vienna (Rokistansky's senior Assistant), and which are published in the *Medizinische Jahrbücher*, 1873, No. 2, and described in the *Medical Times and Gazette*, Aug., 1873, it appears that the generally accepted description of the human impregnated uterus and embryo, is only partially correct. The purport of his observations are: The mucous membrane (mucosa) of the recently gravid uterus is known as the decidua, and which has been commonly divided into a decidua vera, *d. reflexa*, and *d. serotina*; at first, its structure bears some resemblance to the uterine mucosa, in or before menstruation; it is thickened, the glands are dilated, elongated, and tortuous, and there is a great increase of intertubular cells. In every respect the structure of the three portions of the decidua is very similar. Inferiorly the *d. vera* abruptly terminates in an overhanging border at a short distance from the cervix, this last taking no part in the formation of the fetal cavity. During the entire period of pregnancy, the Fallopian tubes, as well as their inferior openings, are patent. Kundrat farther observes that when the impregnated ovum reaches the inferior tubal opening, its progress is not obstructed by an adhesive growth of the opposite mucous surfaces to each other, as some investigators believe

From this brief review of the subject, it will be seen that it is still involved in obscurity, and those who desire further information regarding it, are referred to the various essays by Hunter, Lee, Chaus-

for no such adhesion exists. For the same reason the ovum does not push before it and invaginate a portion of the mucosa, which becomes the decidua reflexa. The latter is clearly an outgrown and infolded portion of the decidua vera, possessing glands on its deep or ovular surface, as well as on its free. The ovum is retained at the fundus of the uterus by the swollen decidua. If the swelling is not very great, the ovum may travel down toward the cervix; and it is for this reason that placenta prævia is more common among multiparæ. He does not believe that the ovum enters the mouth of a gland, but that it develops on the irregular surface of the d. serotina. As pregnancy advances the uterus enlarges, and the connection between it and the ovum becomes more intimate and complex. At first the enlargement of the uterus is out of proportion to the growth of the embryo, and a free cavity exists between the d. vera and the d. reflexa, which is filled with a somewhat opaque mucoid fluid. The embryo does not fill the uterine cavity until the fourth month, and the walls, which were previously disproportionately thick, become disproportionately thin, while the envelopes become transparent. In the fifth month the process has advanced still another step, by the adhesion—partial at least—of the opposite walls of the uterine cavity; that is, of the d. vera and the d. reflexa.

As regards the connection between the chorion and the decidua, it has frequently been stated that the processes or villi of the former pass into the glands of the latter. Kundrat remarks that this arrangement was "but seldom" to be discovered. On the contrary, the chorion-villi were found to be fixed in the grooves of the d. serotina and on the sides of its elevations by a connective mass composed of mucus and degenerated epithelium. Other villi had buried themselves in the tissue of the d. serotina, and formed a connection so intimate that any attempt at separation ended in rupture. It is here that the placenta is afterward developed. As gestation proceeds the changes of the decidua are very considerable, and in the last months peculiarly interesting. The d. reflexa becomes attenuated by pressure until reduced to a simple layer of the transparent envelopes of the embryo, of which it forms the most external portion. On the other hand, the d. vera and the d. serotina remain as comparatively thick layers of tissue, compact and cellular on the surface, but spongy in their deep portion from the presence of the numerous ends of the dilated glands, which represent sinuses lined by epithelium. As the termination of pregnancy approaches there occurs a remarkable change on the lining membranes of the uterus. These, as well as the d. reflexa, become whitish, dull, and of a pale yellowish or even yellowish-gray tint, opacity replaces transparency, and the process, which is discovered by the microscope to be one of fatty degeneration, passes into the deeper layers. This description, of course, reminds us of the simultaneous fatty degeneration of the placenta. When parturition occurs, a portion of the membranes is expelled with the fetus, and it is interesting to inquire what part, if any, of the envelopes is retained. Careful examination certainly reveals that the superficial portion of the decidua vera is, as a rule, included in the fetal membranes, while the deeper portion is retained, although this is not always the case. During the first week post-partum the discolored lining membrane of the uterus may be found, under the microscope, to present the characters of the decidua vera, but the sinuses are full of blood, the superficial cellular layer gone, the fatty degeneration extends to the deepest layers, and the tissue generally is infiltrated with round cells and blood. The lochial discharge consists of such cells and

sier, Breschet, Velpeau, Carus, Granville, M. Coste, Weber, Sharpey, Farre, Priestley, Barry, etc.

At the period of full development of the ovule, it escapes from the vesicle inclosing it, and passes into the Fallopian tube through the agency of the fimbriated extremity of this organ, gradually traversing its canal until it arrives at the uterine cavity. The modifications undergone by the human ovule in its passage through the Fallopian tube, are unknown, but are supposed to be similar to those which occur in the eggs of mammiferous animals, particularly those of the rabbit and dog. In these animals, the first change which has been observed in the ovule after its escape from the ovary, is the entire disappearance of both the germinal vesicle and germinal spot, while at the same time there will be found a collection of granules in the central portion of the ovum. During its travel through the first half of the oviduct, the vitelline membrane becomes somewhat thickened, while a layer of the granulations which formed the proligerous disk of the ovule previous to its departure from the ovary, surrounds the ovum, but which disappears as it traverses the second half of the oviduct, having a layer of a transparent, gelatinous substance to occupy its place around the vitelline membrane, and which albuminous layer, as well as the thickening of the vitelline membrane, continues to increase. While these changes are being effected, the yelk gradually increases in density, forming a compact, homogeneous mass—a transparent fluid occupying the space existing between it and the interior surface of the vitelline membrane; finally, the yelk separates into two regular spherical divisions; these again separate, forming four spheres, and this separation continues, until from the numerous small spherical divisions which are thereby formed, the yelk presents a mulberry or raspberry appearance. These spheres or granulations decompose as the ovum advances toward the cavity of the uterus, and finally disappear, being replaced by a clear and transparent fluid. They are supposed to condense on the inner wall of the vesicle, forming there a second vesicle which has been called the *blastodermic* or *umbilical vesicle* or *membrane*, or *germinal membrane* or *area*. As this blastoderm

of products of disintegration. In the second week post-partum the process has still farther advanced, and the epithelium of the exposed sinuses is found to be proliferating. Restitution now begins and advances, and soon there is found on the surface of the muscular coat a fine layer of connective tissue, covered by epithelium and furnished with young glands, to represent the mucosa of the uterus, which is again at rest.

becomes developed after the arrival of the ovum in the uterus, the albuminous layer surrounding the vitelline membrane disappears, while this membrane diminishes in thickness. About the sixteenth or seventeenth day will be observed a rounded, whitish spot, at some point of the blastodermic vesicle, standing out apparently detached, and which is named the *embryonic spot*, *tache embryonnaire*, or *area germinativa*; it is composed the same as the blastoderm, of cellular granulations, and from it commences the gradual development of the embryo. The blastoderm is composed of two laminæ, the *external animal*, or *serous layer*, and the *internal, mucous, or vegetative layer*, the former of which is supposed to give origin to the brain and spinal cord, organs of sense, cartilage, bones, skin, and muscles, or organs of animal life; and the latter to the lungs, liver, spleen, and digestive tube, or organs of nutrition. A third layer has also been recognized by some investigators, which is situated between the two just named; it is called the *middle or vascular layer*, and is supposed to assist in the development of the heart, circulatory apparatus, etc. The time required for the passage of the human ovum from the ovary to the uterus is supposed to be from eight to ten or twelve days, and it is about this latter period, the twelfth day of pregnancy, that we can distinctly observe the embryo, which then appears to be a mere amorphous vesicle, measuring about three lines, while the entire ovum measures six or seven lines. The envelopes of the ovum are three, the CHORION, TUNICA MEDIA, or MIDDLE MEMBRANE, and the AMNION; and its accessories are four, the UMBILICAL VESICLE, the ALLANTOIS, the PLACENTA, and the UMBILICAL CORD.

The CHORION is a thin, glistening, transparent membrane, very analogous to serous tissues, quite resisting for its tenuity, and forms the external covering of the ovum, passing also over the fetal surface of the placenta and the external face of the umbilical cord, and may be considered as corresponding to the internal lining membrane of an eggshell. It is formed by the union of the vitelline membrane with the albuminous envelope which this acquires while in the oviduct; however, this is still a question among physiologists, some of whom suppose it to be formed by the external layer of the blastodermic vesicle and the allantois. It has two surfaces, an inner or fetal surface, and an external or uterine surface. Both of these surfaces are smooth at first, but at an early period, about the second week of pregnancy, the external surface presents minute granulations, which rapidly

augment in length, forming numerous villi or velvety prolongations with which the chorion soon becomes covered, and which penetrate into the decidua, preventing the ovum from injuriously moving about. These spongy, cylindrical villi disappear from the general surface about the second or third month, but at the spot where the chorion comes in contact with the uterus, and where the secondary caduca or *decidua serotina* is formed, they enlarge and become vascular, giving origin to the placenta. The vascularity of the chorion does not manifest itself until after the development of the allantois, about the second month, when it consists of two layers or laminæ, the *external* or primitive one of which is non-vascular, and is called the *exochorion*; while the other, the *internal* or allantoid layer, is highly vascular, and is named *endochorion*.

In the early period of pregnancy the chorion is separated from the amnion by an albuminous layer, which condenses into a thin web-like membrane termed *tunica media*; and this albuminous fluid is more abundant in the first weeks of gestation. In the midst of this fluid is situated the umbilical vesicle, or yolk-bag. As the ovum matures, the external face of the chorion unites with the decidua reflexa, while its inner face comes in contact with the amnion after the second month; there have been instances, however, where at full term, a considerable quantity of fluid existed between the amnion and chorion, termed *false waters*; its escape has given rise to the belief that the liquor amnii had passed off. When this fluid is discharged several times during one pregnancy, it constitutes *hydorrhœa* (see page 180). The chorion serves to envelope and protect the ovum during its passage from the oviduct to the uterus, furnishes a sheath for the umbilical cord, assists in the production of the placenta, and, probably through the attachment of its villi to the decidua, nourishment is absorbed from the maternal blood by which the vitality of the embryo is sustained; at the parturient period it assists, in connection with the amnion, to form a bag containing the amniotic liquor, which materially promotes the softening and dilatation of the os uteri.

The AMNION is the most internal covering of the embryo, around which it forms a sac; it is very thin, smooth, and transparent, and is more dense and resisting than the chorion, which it very much resembles in structure and appearance. It is supposed to be formed by the internal lamina of the fold of the external serous layer of the blastoderm around the embryo (which forms the cephalic and caudal hoods), and is continuous with the margins of the ventral opening of

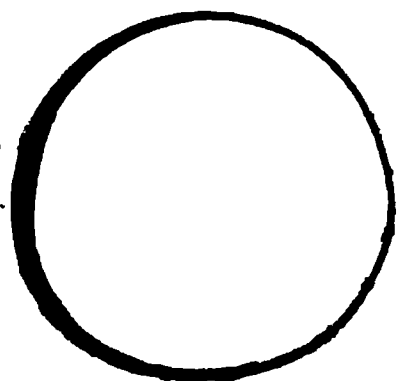
the embryo; however, there are several other views concerning its origin. Its internal surface exhales a liquid in which the embryo floats freely; its external surface is more or less separated from the chorion, the space between them being filled with an albuminous liquid. It apparently consists of condensed cellular tissue, in which neither blood-vessels nor nerves have yet been recognized. As the development of the ovum progresses, the space between the amnion and chorion diminishes, the albuminous fluid found between them gradually disappears, until finally the two envelopes come in contact and adhere to each other. The amnion forms the outer coat of the fetal face of the placenta, and of the cord; and a division of the cord shows us the chorion placed between the cord proper and the amnion. Its uses are to furnish the liquor amnii, to aid in forming the membranes, and bag of waters, and to serve as a covering to the umbilical cord, the liquor amnii, and the fetus.

The LIQUOR AMNII, also known as the *amniotic fluid*, *waters of the amnios*, etc., is a fluid contained within the amnion, and in which the embryo floats; by some it is supposed to be an exhalation or secretion from the amnion, by others to be a product of the fetus, and by others again to be a secretion from both the fetus and its parent. The probability is, that the liquor amnii proper is exhaled by the internal surface of the membranes of the ovum, the elements of which are furnished by the uterine vessels, and that it may be mixed or adulterated with the fetal excretions, especially at an advanced period of pregnancy. This fluid varies in quantity as well as in its properties; during the early stage of gestation, when compared with the fetus, it is proportionally greater, there being from half a fluidrachm to a fluidrachm present when the embryo can hardly be seen by the naked eye, and although it continues to increase until full term, yet its relative proportion to the size of the fetus gradually diminishes, so that at parturition, while the fetus may weigh from six to eight pounds, the quantity of fluid will seldom be found to exceed a pint. In some few cases it may amount to quarts. Its appearance varies from that of a transparent and limpid fluid, more commonly observed in the early period of pregnancy, to that of a thick, slightly yellow, green, or brown color, and which is more usual to the advanced stage. It is soft and viscous to the touch, has a specific gravity of 1.004, and emits an odor somewhat resembling that of semen, though occasionally, especially when the fetus is dead, this odor is putrid and very offensive; its taste is saltish. Sometimes it becomes milky or clouded,

and frequently contains white clots, which are detached pieces of the fetal sebaceous covering; greenish or dark-colored flakes, being portions of undiluted meconium, are likewise often observed in it. Its most common appearance at parturition is that of a dingy liquid, having a tinge of yellow or green. Heat renders it cloudy; alcohol or caustic Potassa causes a fleecy precipitate, with which nutgalls form a brownish deposit, similar to a dilute solution of gelatin; Nitrate of Silver occasions an abundant white precipitate, which is insoluble in Nitric Acid; and the tincture of Violets becomes changed to green by it. Analysis has found in it a large proportion of water, with albumen, albuminate of soda, chloride of sodium, carbonate of soda, phosphate and carbonate of lime, urea, and, probably, a peculiar free acid, called *amnic* or *amniotic acid*. Its use appears to be to protect the embryo from any severe compression of the uterine walls; to protect it from the effects of falls or blows; to prevent any adhesion of the fetus while in utero, and allow it free motion; to protect the fetus, during parturition, from the injurious effects of uterine contraction upon its body, until all its parts are in a suitable condition to permit its expulsion; to aid in the dilatation of the os uteri, at term, by means of the bag of waters, as well as to lubricate the parts through which the fetus has to pass, thereby facilitating its delivery. Some physiologists believe that it likewise aids in nourishing the fetus, previous to the formation of the placenta and establishment of the fetal circulation.

The UMBILICAL VESICLE, *vesicula umbilicus*, or *vesicula alba*, *yelk-bag*; is formed by the internal, or mucous layer of the blastoderm; it is of a rounded, or pyriform shape, is situated in the space between the amnion and chorion, and communicates by a long pedicle, or duct, with the intestinal tube, upon which it lies. It forms

FIG. 26

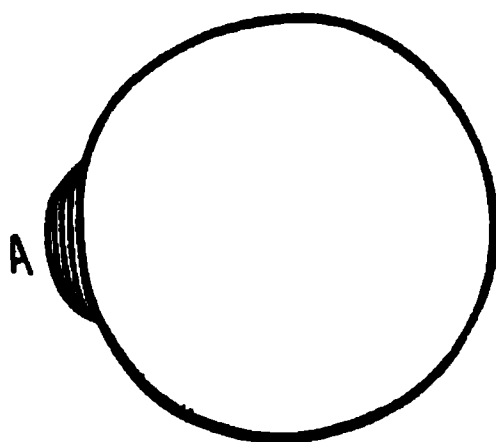
SEGMENT OF THE SPHERE
OF THE VITELLUS.

a sac, seldom larger than a small pea, and contains a viscid, transparent, yellowish-white fluid, in which may be seen a few globules and numerous granules. It appears to be composed of an external or vascular layer, and an internal or mucous layer. The following account of its formation, is given by Prof. Meigs: "When the blastoderm has partly undergone the morphological changes that convert it into the earliest rudimental embryo, part of the yelk corpuscles still remained unappropriated; and as

they are still contained in their original vitelline membrane, they constitute a small but visible ball, called the umbilical vesicle. Originally, the vitellus was a sphere, of which *Fig. 26* represents a segment. The blastoderm is developed upon a segment of this sphere as at *A*, in *Fig. 27*. When the blastoderm doubles or folds its edges inward, it pinches (or contracts) a portion of the vitellary ball, as in *Fig. 28*. In a still further progress, as shown by *Fig. 29*, the portion of the vitellary ball that remains outside of the embryo is connected to the embryo by a delicate tube, or vitellary duct." Velpeau states, that this duct opens into the fetal ilium; Rigby, Ludlow, and Oker, consider the appendicula vermiformis as the remains of it. As pregnancy advances, the yolk having been transformed, the umbilical vesicle becomes atrophied, and the development of the amnion removes it further and further from the embryo, at the same time elongating its duct or pedicle, the canal of which remains open till the sixth or eighth week of gestation, after which it is obliterated, and the umbilical vesicle becomes flattened, diminished, of a lenticular shape and gradually fused into the cord, and entirely disappears after the third or fourth month; in a few rare cases, it has been found at full term. Its use is supposed to be to afford nourishment to the embryo, until its placental connection with the mother is established.

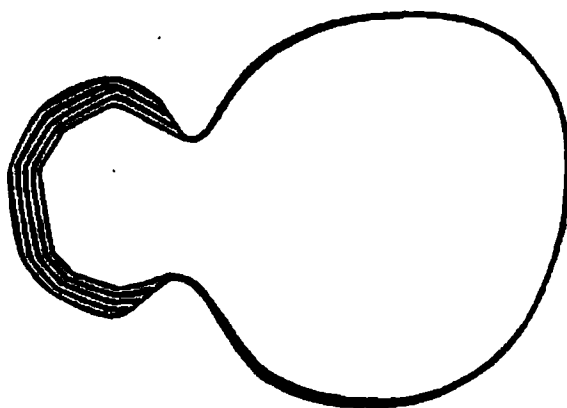
The external or vascular layer of the umbilical vesicle has ramifying over its parietes two blood-vessels, an artery, and a vein, which are called the *omphalo-mesenteric*, or *vitello mesenteric vessels*, and which accompany the pedicle, forming a part of it. The *omphalo-mesenteric artery* arises from the aorta, and as it reaches the summit of the intestinal

FIG. 27.



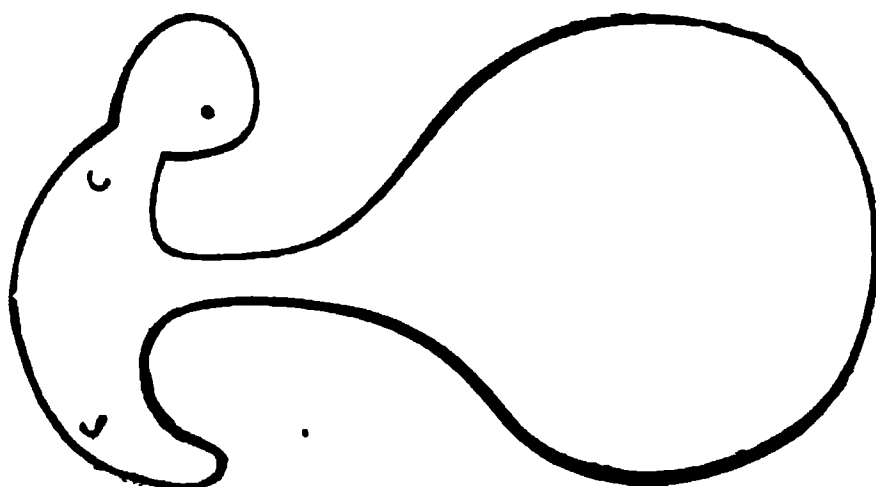
BLASTODERM DEVELOPED UPON THE SEGMENT OF THE SPHERE OF THE VITELLUS.

FIG. 28.



INWARD FOLDING OF THE EDGES OF THE BLASTODERM.

FIG. 29.



FURTHER PROGRESS OF THE BLASTODERM.

convolutions, it gives off branches to the mesentery and to the intestine; then it extends to the pedicle, through which it passes until it reaches the umbilical vesicle, upon which it is distributed. In the adult, that part which supplies the mesentery is converted into a mesenteric artery, all the rest being obliterated, as the umbilical vesicle disappears. The *omphalo-mesenteric vein*, enters the abdomen, passes around the duodenum, and opens into the umbilical vein just as this is emerging from the liver. In its passage around the duodenum it gives off branches to the stomach and intestines, and when it empties into the umbilical vein, it sends a large trunk to the liver; the whole disappears with the vesicle and its pedicle, except that portion which furnishes the

FIG. 30.

above branches, which remains in the adult as the *ventral*, or *hepatic-portal vein*. Professor Meigs admirably illustrates the arrangement of the omphalo-mesenteric vessels, and cord, by the following diagram, *Fig. 30*: "Let A A, be a portion of the abdomen of the embryo, and C C, the navel, or umbilical ring; B B, the navel string, or cord, laid open; D, the umbilical vein, bringing back the blood from the placenta, and passing into the belly at the ring, to go to the liver; E, F, the two umbilical arteries of the fetus; H, the umbilical vesicle, or vitelline sac, whose pipe, conduit, or efferent-duct runs

DIAGRAM OF THE OMPHALO-MESENTERIC VESSELS.

along the umbilical cord to the navel, and passing into the belly empties itself into the ilium, G G, which bends up to receive the discharge; K, L, represents the omphalo-mesenteric vessels."

The ALLANTOIS, or *allantoid vesicle*, is a small sac, or bladder, which may be observed about the tenth day, and which arises from the inferior part of the intestinal canal, or caudal extremity of the embryo; it is found near the umbilical vesicle, between the chorion and amnion; its growth is rapid, and soon becomes attached, by its base, to the

inner surface of the chorion. On the parietes of the allantois are distributed the terminal branches of the two umbilical arteries and vein. The *urachus*, or *pedicle of the allantois*, is a cord, which is pervious in early embryonic life, and which passes out of the fetal body at the navel, being accompanied by the umbilical blood-vessels to the chorion, which they pierce, sending branches into its villi, which increase in size as these villi form the placental connection with the uterus.

The allantois rapidly disappears, so that in a few days after its appearance there can be observed only a cord of greater or less length, passing from the embryo to the chorion, and containing the umbilical vessels within it; this cord, likewise, gradually becomes lost in the substance of the umbilical cord, only a portion of it remaining within the abdomen of the embryo, to form the *urachus*, at the rectal termination of which is subsequently formed the urinary bladder. In consequence of this early disappearance of the allantois, many physiologists have denied its existence. The use of this vesicle, or membrane, is to conduct blood from the embryo to the chorion, or, as remarked by Prof. Meigs, "the allantois may be said to be a bladder, or vesicle, upon which the umbilical arteries climb toward the wall of the womb, to attach themselves there." It is, likewise, stated to receive the urine of the fetus, secreted in early uterine life. Dr. Carpenter makes the following remarks in relation to this vesicle:

"With the evolution of a circulatory apparatus, adapted to absorb nourishment from the store prepared for the use of the embryo, and to convey it to its different tissues, it becomes necessary that a respiratory apparatus should also be provided, for unloading the blood of the carbonic acid, with which it becomes charged during the course of its circulation. The temporary respiratory apparatus, now to be described, bears a strong resemblance in its own character, and especially in its vascular connections, with the gills of the mollusca; which are prolongations of the external surface (usually near the termination of the intestinal canal), and which almost invariably receive their vessels from that part of the system. This apparatus is termed the allantois. It consists at first of a kind of diverticulum, or prolongation, of the lower part of the digestive cavity, the formation of which has been already described. This is at first seen as a single vesicle, of no great size; and in the fetus of mammalia, which is soon provided with other means of aerating its blood, it seldom attains any considerable dimensions. In birds, however, it becomes so large as to extend itself around the whole yolk-sac, intervening between it and the membrane of the shell; and through the latter it comes into relation with the

external air. The diagram (*Fig. 31*), will serve to explain its **origin** and position in the human ovum. The chief office of the allantois, in

FIG. 31.

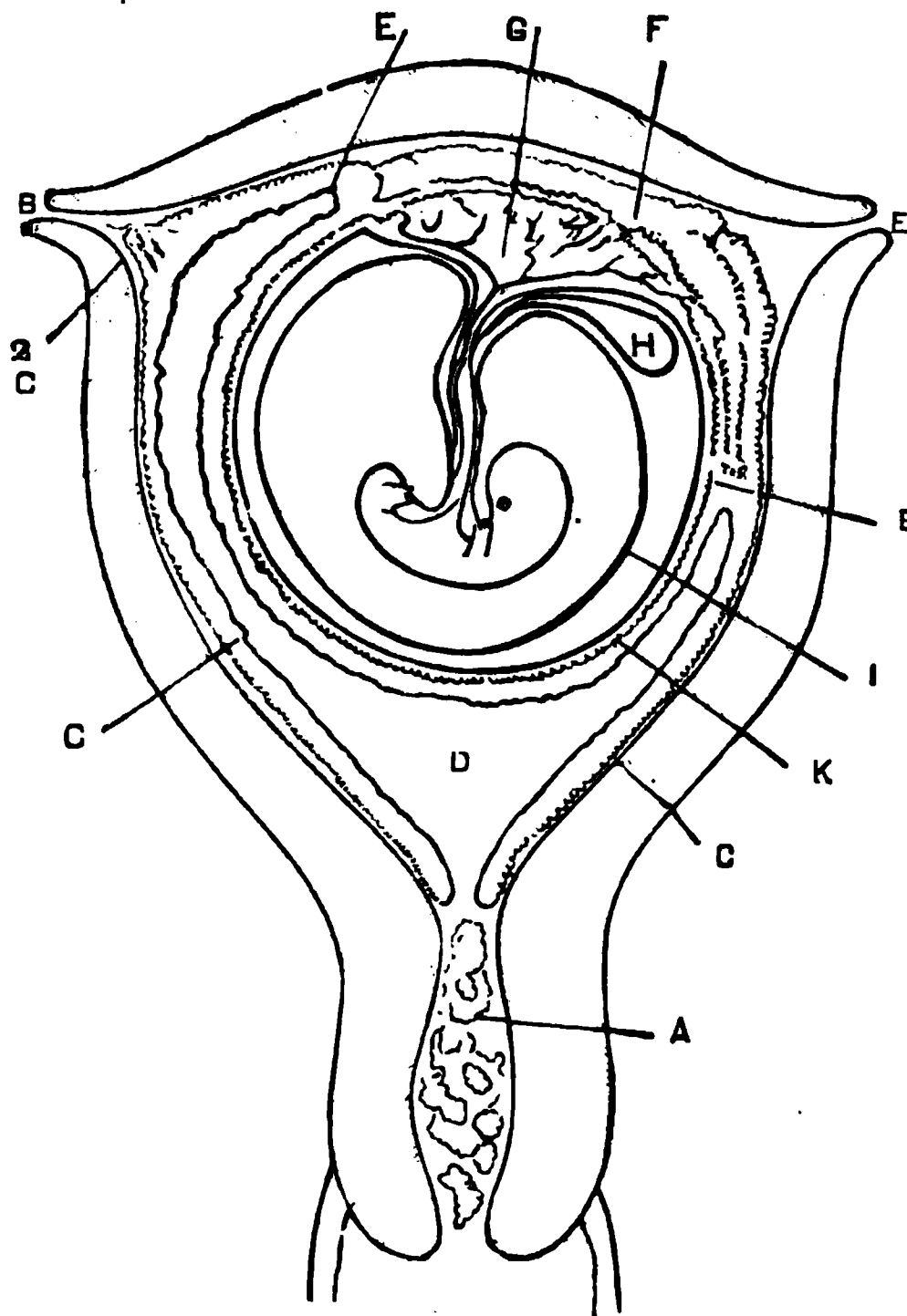


DIAGRAM OF THE HUMAN OVUM AT THE TIME OF THE FORMATION OF THE PLACENTA.

- A. Muco-gelatinous substance blocking up the Os Uteri.
- B B. Fallopian Tubes.
- C C. Decidua Vera, at 2 C, prolonged into the Fallopian Tube.
- D. Cavity of the Uterus, almost completely occupied by the Ovum.
- E E. Angles at which the Decidua Vera is reflected.
- F. Decidua Serotina.
- G. Allantois.
- H. Umbilical Vesicle.
- I. Amnios.
- K. Chorion, with the outer fold of Serous Tunic.

mammalia, is to convey the vessels of the embryo to the chorion; and its extent bears a pretty close correspondence with the extent of surface, through which the chorion comes into vascular connection with the decidua. Thus, in the carnivora, whose placenta extends like a band around the whole ovum, the allantois also lines the whole inner surface of the chorion, except where the umbilical vesicle comes in contact with it. On the other hand, in man and the quadrumana,

whose placenta is restricted to one spot, the allantois is small, and conveys the fetal vessels to one portion only of the chorion. When these vessels have reached the chorion, they ramify in its substance, and send filaments into its villi; and in proportion as these villi form that connection with the uterine structure, which has been already described, do the vessels increase in size. They then pass directly from the fetus to the chorion, and the allantois being no longer of any use, shrivels up, and remains as a minute vesicle, only to be detected by careful examination. The same thing happens in regard to the umbilical vesicle, from which the entire contents have been by this time exhausted; and from henceforth the fetus is entirely dependent for the materials of its growth, upon the supply it receives through the placenta, which is conducted to it by the vessels of the umbilical cord. This state of things is represented in the diagram (*Fig. 31*). The allantois has a correspondence in situation with the urinary bladder; but it is only the lower part of it pinched off, as it were, from the rest, that remains as such. The duct by which it is connected with the abdomen gradually shrivels; and a vestige of this is permanent, forming the *urachus*, or suspensory ligament of the bladder, by which it is connected with the umbilicus. Before this takes place, however, the allantois is the receptacle for the secretion of the *corpora wolffiana*, and of the true kidneys, when they are formed."

The PLACENTA, or *afterbirth*, is a soft, spongy, vascular mass, occupying about one-third of the external covering of the ovum, and forming the principal connection between the embryo and the uterus. It is a flattened, irregularly circular body, of a more or less intense reddish-gray color, varying in diameter from six to nine inches, sometimes having one diameter longer than the others, about an inch in thickness at its point of junction with the umbilical cord, from which it gradually tapers off toward the circumference, which seldom exceeds two or three lines, and weighing one or two pounds, depending, however, upon its size and the amount of blood it contains. It most usually has the umbilical cord inserted at its center; occasionally this passes into it, at or near the circumference, and with this disposition the vessels of the cord will frequently be found to separate into numerous branches before they reach the substance of the placenta; this is termed the *battledore placenta*. The placenta, umbilical cord, and membranes, are collectively called the *secundines*.

The placenta presents two surfaces, an *external* or *uterine*, and an *internal* or *fetal*. The *fetal surface* has a smooth, polished appearance,

and is marked by the numerous radiations of the vessels of the umbilical cord, forming a kind of network, which may enable us to distinguish the placenta in artificial deliveries; this surface is covered by the chorion and amnion, the former of which intimately adheres to it, and sends processes between the lobules, while the latter is loose and nearest the fetus. Each one of the umbilical arteries upon reaching the placental surface divides into two branches, and this dichotomous division is repeated until these vessels have diminished in size to a diameter of about three-sixteenths of an inch, when they pass through the chorion into the placental tissue, numerous subdividing to form the ultimate villous tufts or ramifications; the blood is then conveyed back to the cord, by about sixteen veins, which run on the placental surface along side of the chief branches just referred to, and terminate in the one vein of the umbilical cord. The *uterine surface*, when removed from the uterine wall, presents a uniform, but not smooth appearance, and is slightly convex; it has a fleshy resemblance, and is divided by deep sulci or furrows into numerous irregularly shaped lobes, from half an inch to about an inch and a half in diameter, which are connected with each other, at the bottom of these sulci, by a loose cellular, or, according to Velpeau, lamellated, albuminous tissue, which is easily lacerated. Upon an investigation, it will be found that each of these lobes or cotyledons, is formed by the ramifications of one branch of the umbilical arteries and veins, on their first separation, and that the vessels of one lobe do not anastomose with those of another, and but slightly with each other. This surface is not in direct contact with the uterine wall, but is separated from it by the interposition of the *decidua serotina* or *placental decidua*, an albuminous layer analogous in appearance to the true caducous membrane, which is more firmly attached to the placenta than to the uterus, and which enters into the fissures separating the lobes, when not too deep, in which latter case it passes from one lobe to another, forming a kind of membranous bridge, while a thick partition of cellulo-mucous substance penetrates deeply between the lobes. The *circumference* of the placenta is thin and irregular, and measures from twenty-one to twenty-seven inches; its margin is continuous with the chorion, and is contiguous to the fold formed by the caduca when passing over the ovum to constitute the decidua reflexa; between this fold and the placental circumference is a thickening or density of substance, so disposed for the reception of the placental border as to form a triangular sinus.

The earliest rudiments of the placenta are observed toward the

termination of the first month of pregnancy, which become gradually developed until the third month, when the organ acquires its proper character, and continues to increase in size with the growth of the fetus. As soon as the ovule has reached the uterus, the chorion is observed to be covered with numerous villi which give to it a downy appearance, but those villi in contact with the decidua reflexa, probably from an absence of proper material for their development, become atrophied and filamentous, serving merely as points of union between the chorion and decidua; while those which are exposed to the uterine wall, receiving nourishment from the exudation of lymph which takes place on the surfaces of both the uterus and ovum, continue to develop themselves, elongate, become converted into vessels, and ultimately form the placental part of the placenta. (*Fig. 31.*) The uterine portion of the placenta is the lymph above referred to, which forms a thin, soft, delicate tissue known as the decidua serotina, and which is furnished more copiously by the uterus, on account of the superior size and vitality of this organ compared with those of the ovum. At that portion of the uterus where the placenta is situated, will be found large cells or sinuses which communicate freely with each other, but which do not extend beyond the decidua serotina, this membrane answering the purpose of a valve to prevent the blood in them from passing into the cavity of the gravid uterus; these cells are the uterine sinuses, and into them the blood is poured by the curling uterine arteries terminating in a capillary extremity. The capillary vessels of the fetus, covered by the thin decidua, insinuate themselves into these sinuses, and, without any interference of the circulation of either the fetal or maternal fluid, the change is here effected which probably removes the effete matter of the fetal blood, while at the same time this fluid absorbs oxygen from the maternal blood; and these changes are brought about without the existence of any vascular intercommunication between the mother and fetus, the action somewhat resembling that which takes place in the lungs of an adult, between the venous blood and the atmospheric air—Weber, Kolliker, Turner, Wincklen, and Delore, have demonstrated that the maternal blood does circulate in the placenta, bathing the villosities of this formation. And Dr. T. Snow Beck affirms that “the cavernous structure of the placenta is in direct communication with the canals of the sinuses or veins, and that these vessels carry the blood away from the placenta, which is brought there by the utero-placental arteries,” and that there “is no such thing as a *feeble wall* or *delicate*

membrane, either *at* or *forming* the line of separation, nor, indeed, structures of any kind that prevent the flow of blood direct from the placenta into the uterine sinuses or veins."

The placenta may attach itself to any part of the internal surface of the uterus, more commonly at or near the orifice of one of the tubes, occasionally in the vicinity toward the fundus, rarely toward the neck, and still more seldom over the inner os uteri; this latter position is termed *placenta prævia*, and is dangerous to both mother and child on account of the hemorrhage which is apt to ensue as it becomes detached from the uterine wall, during labor, by the dilatation of the os uteri. These placental situations are supposed to be determined by the character of the adhesion existing between the caduca and uterine wall, as to firmness as well as to the degree of resistance afforded by the caduca to the advancing ovule; thus, if the adhesion be weak between the decidua and uterine wall at the uterotubal orifice, the ovule may slip or pass down between them until it meets with sufficient resistance to impede its further progress, and at this point, where it is stayed, commences the formation of the decidua reflexa, as well as of the placenta. And if the attachment be so slight as to permit the fecundated ovule to pass out of the uterus and through the canal of the cervix, conception does not take place. It must be borne in mind, that the attachment of the placenta is by apposition only, the decidua serotina being interposed between it and the uterine wall; and when actual adhesion occurs, it is invariably the result of disease.

In cases where more than one fetus is present, we generally find a separate cord, placenta, and set of membranes for each one, and though the placentæ may be joined together, forming apparently a single organ, yet there will be no anastomosing of the blood-vessels, the circulation of each child being perfectly independent, so that should one die or become diseased in utero, the other may continue to live or be healthy. In some few instances, there have been found exceptions to this—two children have been inclosed in one bag of membranes, or when in separate ones, there has been a communication of their vascular systems.—The use of the placenta is to form the principal connection between the embryo and the uterus in order to contribute to the nourishment of the former. (*Fig. 31.*)

The UMBILICAL CORD, *funis umbilicalis*, or *navel string*, is a long, flexible, and vascular cord which serves as a connecting medium

between the fetus and placenta. It has two insertions, a placental and a fetal. The placental insertion is usually in the center of the placenta, though it may occur at any point between the center and circumference of this organ; the fetal insertion is at the umbilicus. At birth, its average length is from sixteen to twenty-four inches, though it frequently varies from this measurement, having been found several feet long, and again only six or seven inches. Its thickness is likewise variable; ordinarily it is about equal to that of the little finger; when it exceeds this it is termed a *fat cord*, and when it is smaller it is called a *lean cord*. This variation in its thickness depends upon the larger or smaller amount of a viscid, semi-transparent fluid which is infiltrated in the cellular tissue of the cord, and which is named the *gelatine of Wharton*; this fluid is coagulable by heat and acids, and when unequally distributed occasions swellings or nodes on the cord.

During the early weeks of pregnancy the umbilical cord does not exist; its first appearance is about the end of the first month, when the embryo is fully separated from the blastodermic vesicle, at which period it is composed of the duct of the umbilical vesicle, urachus, omphalo-mesenteric vessels, and a covering of amnion and chorion. It is now cylindrical, thick and short, but elongates in proportion as the umbilical vessel removes and disappears. At about the commencement of the third month, the umbilical vesicle, urachus, and omphalo-mesenteric vessels being obliterated and amalgamated with the cord; this now consists of two arteries, one vein, fine areolar tissue, gelatine of Wharton, and an external covering of amnion and chorion, which elements remain until the termination of pregnancy. At first the cord is straight, but after the second month, a torsion of the vessels commences, the two arteries run uniformly and spirally around the vein, usually in a direction from left to right; the vein thus occupying the axis of the cord.

The vein of the umbilical cord is of a thickness nearly, if not quite equal, to that of the two arteries combined; it has no valves, its walls are thin but firm, and it performs the functions of an artery, carrying the pure and vitalized blood from the placenta to the fetus. It arises from the placenta; the venous ramifications of each placental lobe uniting on the surface of the placenta to form the cord, which passes onward into the umbilical ring of the fetus, where it separates from the two arteries and proceeds toward the liver.

The two arteries of the umbilical cord arise from the fetal internal iliacs, of which they are branches, and proceed toward the umbilicus,

where they separate and traverse the vein in a tortuous manner until they reach the placenta, into which they give off numerous ramifications. The walls of the arteries are thick, resisting, and contractile, and they pulsate strongly. The arteries perform the office of veins, as they convey the adulterated blood from the fetus to the placenta. It is very rarely that any different arrangement of the cord from the above, has been observed; a few instances have been related where but one artery was present, and Velpeau has stated that two veins have been met with. The colors of the blood in the vein and arteries resemble each other so nearly as to be scarcely distinguishable.

The cord is subject to abnormities and accidents, as, a division of the vessels before having reached the placenta, a varicose or hydatidic condition, a rupture of the coats, a closure of the vessels, an insertion into some other part of the fetus than the umbilicus, or into a wrong part of the decidua, and twists or knots, especially when the cord is very long, which interfere more or less with the circulation and consequent nutrition of the fetus. Any of these conditions may occasion the death of the fetus, and abortion, though, some of them, when slight, exert no important influence. The cord is most commonly above the head of the child, yet there are often exceptions; it has been found coiled once or twice around the child's neck, or body, or a limb, in some instances causing death by strangulation, or the loss of a limb; occasionally, it is found presenting before the fetal head. In cases of twins, each fetus has its own cord, though instances have been met with where there existed a communication between the cords of the several fetuses.

CHAPTER XV.

OF THE FETUS AND ITS DEVELOPMENT.

THE *ovule*, or *ovum*, is the human egg previous to its impregnation, though these terms are frequently applied to the embryo and the fetus; as long as this is amorphous or of an undetermined form, it has received the name of *germ*; from the period when a definite form can be observed until the third month, it is called the *embryo*, from which time until its expulsion from the uterus, the term *fetus* is applied to it.

After birth it becomes the *child* or *infant*, though either of these latter terms are often used synonymously with *fetus*.

The study and investigation of the development of the human embryo (*Fig. 32*), is one which the student finds attended with considerable difficulty; for, notwithstanding the many discoveries of physiologists on this point, there still remain much obscurity and uncertainty attached to it, as is evident from the various views which have from time to time been presented to the profession. Dr. Rigby, in his work on Midwifery, has probably, given the clearest, and at the same time the most concise illustration of the researches and conclusions of those who have investigated the subject, as will be found in the following quotation, which will, I trust, prove acceptable to all who are interested:

"*Embryo*.—There is, perhaps, no department of physiology which has been so remarkably enriched by recent discoveries, as that which relates to the primitive development of the ovum and its embryo. The researches of Baër, Rathke, Purkinje, Valentin, etc., in Germany; of Dutrochet, Prevost, Dumas, and Coste, etc., in France; and of Owen, Sharpey, Allen, Thompson, Jones, and Martin Barry, in England, but more especially those of the celebrated Baër, have greatly advanced our knowledge of these subjects, and led us deeply into those mysterious processes of nature which relate to our first origin and formation.

"These researches have all tended to establish one great law, connected with the early development of the human embryo, and that of other mammiferous animals, viz.: that it at first possesses a structure and arrangement analogous to that of animals in a much lower scale of formation; this observation also applies, of course, to the ovum itself, since a variety of changes take place in it after impregnation, before a trace of the embryo can be detected.

"At the earliest periods, the human ovum bears a perfect analogy to the eggs of fishes, amphibia, and birds; and it is only by carefully examining the changes produced by impregnation in the ova of these lower classes of animals, that we have been enabled to discover them in the mammalia and human subject.

FIG. 32.

SECTION OF A MORE DEVELOPED OVUM, IN WHICH THE TWO PORTIONS — THE EMBRYONIC AND UMBILICAL VESICLE—BEGIN TO APPEAR.

- O. Umbilical Vesicle.
- I. Internal layer of the Blastodermis.
- E. External layer.
- V. Vitelline Membrane.

FIG. 33.

SECTION OF A HEN'S EGG WITHIN THE OVARY.

- A. The Granular Membrane forming the Periphery of the Yolk.
- B. Vesicle of Purkinje, imbedded in the Cumulus.
- C. Vitellary Membrane.
- D. Inner and Outer Layers of the Capsule of the Ovum.
- E. Indusium of the Ovary.

lar membranous sac (the *blastodermic membrane*), which is covered by an investing membrane called the *vitelline membrane* or *yolk-bag*. The impregnated vitellus is retained in its capsule in the ovary, precisely as the ovum of the mammifera is in the Graafian vesicle. The whole ovary in this case has a clustered appearance, like a bunch of grapes, each capsule being suspended by a short pedicle of indusium.

"In those ova which are considerably developed before impregnation, the granular blastodermic membrane is observed to be thicker, and the granules more aggregated at that part which corresponds to the pedicle, forming a slight elevation with a depression in its center, like the cumulus in the proligerous disk of a Graafian vesicle. This little disk is the blastoderma, germinal membrane, or cicatricula; in the central depression just mentioned is an exceedingly minute vesicle, first noticed by Professor Purkinje, of Breslau, and named after him;

FIG. 34.



- A. Vitelline Membrane.
- B. Blastoderma.

From T. W. Jones.

in more correct language, it is the *germinal vesicle*. (Fig. 34.)

"According to Wagner, the germinal vesicle is not surrounded by a disk before impregnation; and it is only after this process that the above-mentioned disk of granules is formed. By the time the ovum is about to quit the ovary, the vesicle itself has disappeared, so that an ovum

has never been found in the oviduct containing a germinal vesicle,

"As the bird's egg, from its size, best affords us the means of investigating these changes, and as in all essential respects they are the same in the human ovum, it will be necessary for us to lay before our readers a short account of its structure and contents, and also of the changes which they undergo, after impregnation. In doing this, we shall merely confine ourselves to the description of what is applicable to the human ovum. (Fig. 33.)

"The egg is known to consist of two distinct parts, the vitellus or yolk surrounded by its albumen or white; to the former of these we now more particularly refer. The yolk is a granular albuminous fluid, contained in a granu-

nothing remaining of it beyond the little depression in the cumulus of the cicatricula.

"The rupture of the Purkinjean or germinal vesicle has been supposed by Mr. T. W. Jones to take place before impregnation; but the observations of Professor Valentin seem to lead to the inference that it is a result of that process, and must be therefore looked upon as one of the earliest changes which take place in the ovum or yelk-bag upon quitting the ovary.*

"During its passage through the oviduct (what in mammalia is called the Fallopian tube), the ovum receives a thick covering of albumen, and as it descends still farther along the canal the membrane of the shell is formed.

"On examining the appearance of the ovum in mammiferous animals, and especially the human ovum, it will be found that it presents a form and structure very analogous to the ova just described, more especially those of birds. It is a minute, sphericle sac, filled with an albuminous fluid, lined with blastodermic or germinal membrane, in which is seated the germinal vesicle or vesicle of Purkinje. When the ovum has quitted the ovary the germinal vesicle disappears, and on its entering the Fallopian tube it becomes covered with a gelatinous, or rather albuminous covering. This was inferred by Valentin, who considered that 'the enormous swelling of the ova, and their passage through the Fallopian tubes,' tended to prove the circumstance. (*Edin. Med. and Surg. Journal*, April, 1836.) It has since been demonstrated by Mr. T. W. Jones, in a rabbit seven days after impregnation. The vitellary membrane seems, at this time, to give way, leaving the vitellus of the ovum merely covered by its spherical blastoderma, and incased by the layer of albuminous matter which surrounds it.

"From what we have now stated, a close analogy will appear between the ova of the mammalia and those of the lower classes, more especially birds, which from their size afford us the best opportunities of investigating this difficult subject.

"In birds, the covering of the vitellus is called *yelk-bag*; whereas, in mammalia and man it receives the name of *vesicula umbilicalis*. Its albuminous covering, which corresponds to the white and membrane of the shell in birds, is called *chorion*: by the time that the

* We said, "one of the earliest changes." Mr. Jones considers that "the breaking up of the surface of the yelk into crystalline forms," is the first change which he has observed.

ovum has reached the uterus, this outer membrane has undergone a considerable change; it becomes covered with a complete down of little absorbing fibrillæ, which rapidly increase in size as development advances, until it presents that tufted, vascular appearance, which we have already mentioned when describing this membrane.

"The first or primitive trace of the embryo is in the cicatrix or germinal membrane, which contained the germinal vesicle before its disappearance. In the center of this, upon its upper surface, may be discovered a small dark line:* 'this line or primitive trace is swollen at one extremity, and is placed in the direction of the transverse axis of the egg.' (Fig. 35.)

FIG. 35.



A. Transparent Area.

B. Primitive Trace.

"As development advances, the cicatrix expands. 'We are indebted to Pander,'† says Dr. Allen Thompson, in his admirable essay, above quoted, 'for the important discovery, that toward the twelfth or fourteenth hour, in the hen's egg the germinal membrane becomes divided into two

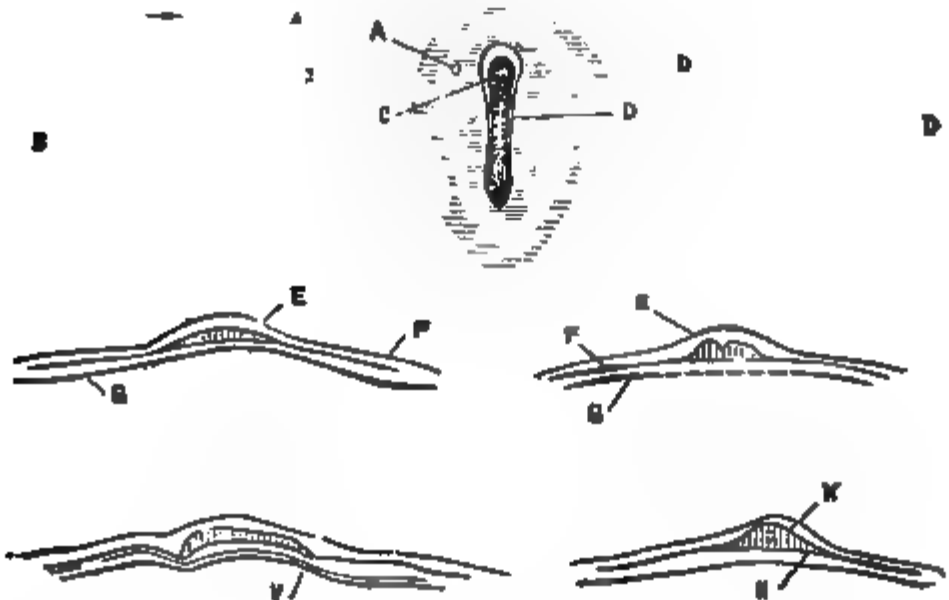
layers of granules, the serous and mucous layers of the cicatrix; and that the rudimentary trace of the embryo, which has at this time become evident, is placed in the substance of the uppermost or serous layer.' 'According to this observer, and according to Baer, the part of this layer which surrounds the primitive trace soon becomes thicker; and on examining this part with care, toward the eighteenth hour, we observe that a furrow has been formed in it, in the bottom of which the primitive trace is situated; about the twentieth hour this furrow is converted into a canal open at both ends, by the junction of its margins (the *plicæ primitivæ* of Pander, the *laminæ dorsales* of Baer): the canal soon becomes closed at the cephalic or swollen extremity of the primitive trace, at which part it is of a pyriform shape, being wider here than at any other part. According to Baer and Serres, some time after the canal begins to close, a semi-fluid matter is deposited in it, which on its acquiring greater consistence, becomes the rudiment of

*Allen Thompson on the Development of the Vascular System in the Fetus of Vertebrated Animals. (Edin. New Philosoph. Journal, Oct. 1830.)

†Pander, Beiträge zur Entwicklungs-geschichte des Hühnchens im Eie. Würzburg, 1817.

the spinal cord; the pyriform extremity or head is soon after this seen to be partially subdivided into three vesicles, which being also filled with a semi-fluid matter, gives rise to the rudimentary state of the encephalon.' 'As the formation of the spinal canal proceeds, the parts of the serous layer which surround it, especially toward the head, become thicker and more solid, and before the twenty-fourth hour we observe on each side of this canal four or five round opaque bodies; these bodies indicate the first formation of the dorsal vertebræ. (Fig. 36.)

FIG. 36.



A. Transparent Area.

B. Laminae Dorsales.

C. Cephalic End.

D. Rudiments of Dorsal Vertebræ.

E. Serous Layer.

F. Lateral Portion of the Primitive Trace.

G. Mucous Layer.

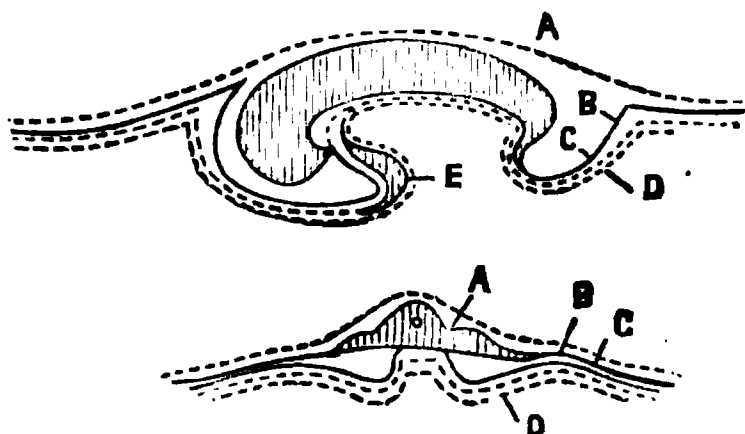
H. Vascular Layer.

K. Laminae Dorsales united to form the Spinal Canal.

"About the same time, or from the twentieth to the twenty-fourth hour, the inner layer of the germinal membrane undergoes a farther division, and by a peculiar change is converted into the vascular mucous layers.' (A. Thompson, *op. cit.*) It will thus be seen, that the germinal membrane is that part of the ovum in which the first changes produced by impregnation are observed. The rudiments of the osseous and nervous systems are formed by the outer or serous layers; the outer covering of the fetus or integuments, including the amnios, are also furnished by it. 'The layer next in order, has been called *vascular*, because in it the development of the principal parts of the vascular system appears to take place. The third, called the *mucous* layer, situated next the substance of the yolk, is generally in intimate connection with the vascular layer, and it is to

the changes which these combined layers undergo, that the intestinal, the respiratory, and probably also the glandular systems, owe their origin.' (A. Thompson, *op. cit.*, p. 298. (*Fig. 37.*)

FIG. 37.



A. Serous Layer.

B C. Vascular Layer.

D. Mucous Layer.

E. Heart.

"The embryo is therefore formed in the layers of the germinal membrane, and becomes as it were, spread out upon the surface of the ovum: the changes which the ovum of mammalia undergoes appear, from actual observation, to be precisely analogous to those in the inferior animals.

(*Baër, Prevost, and Dumas.*) From the primitive trace, which was at first merely a line crossing the cicatricula, and which now begins, rapidly to exhibit the characters of the spinal column, the parietes of the head and trunk gradually approach farther and farther toward the anterior surface of the abdomen and head until they unite; in this way the sides of the jaws close in the median line of the face, occasionally leaving the union incomplete, and thus appearing to produce in some cases the congenital defects of hair lip and cleft palate. In some way the ribs meet at the sternum; and it may be supposed that sometimes this bone is left deficient, and thus may become one of the causes of those rare cases of malformation, where the child has been born with the heart external to the parieties of the thorax. In like manner the parietes of the abdomen and pelvis close in the linea alba and symphysis pubis, occasionally leaving the integuments of the navel deficient, or, in other words, producing congenital umbilical hernia, or at the pubes a non-union of its symphysis with a species of inversion of the bladder, the anterior wall of that viscus being nearly or entirely wanting.

"The cavity of the abdomen is therefore at first open to the vesicula umbilicalis or yelk, but this changes as the abdominal parietes begin to close in; in man and the mammalia merely a part of it, as above mentioned, forms the intestinal canal, whereas, in oviparous animals, the whole of the yelk-bag enters the abdominal cavity, and serves for an early nutriment to the young animal. Another change connected with the serous or outer layer of the germinal membrane is the formation of the *amnion*. The fetal rudiment, which from its shape has been called *carina*, now begins to be enveloped by a membrane of exceeding tenuity, forming a double covering upon it; the one which

immediately invests the fetus is considered to form the future epidermis; the other, or outer fold, forms a loose sac around it, containing the liquor amnii. While these changes are taking place in the serous layer of the germinal membrane, and while the intestinal canal, etc., are forming on the anterior surface of the embryo, which is turned toward the ovum, by means of the inner or mucous layer, equally important changes are now observed in the middle or vascular layer. 'In forming this fold,' says Dr. A. Thompson, 'the mucous layer is reflected farthest inward; the serous layer advances least, and the space between them, occupied by the vascular layer, is filled up by a dilated part of this layer, the rudiment of the heart.' (*Op. cit.*, p. 301.)

"While this rudimentary trace of the vascular system is making its appearance, minute vessels are seen ramifying over the vesicula umbilicalis, forming, according to Baer's observations, a reticular anastomosis, which unites into two vessels, the vasa omphalo-meseraica. (*British and Foreign Med. Rev.* No. 1.) These may be demonstrated with great ease in the chick; the cicatricula increases in extent; it becomes vascular, and at length forms a heart-shaped network of delicate vessels, which unite into two trunks, terminating one on each side of the abdomen. (*Fig. 38.*)

"The umbilical vesicle now begins to separate itself more and more from the abdomen of the fetus, merely a duct of communication passing to that portion of it which forms the intestinal canal. The first rudiment of the cord will be found at this separation; its fetal extremity remains for a long time funnel-shaped, containing, beside a portion of intestine, the duct of the vesicula umbilicalis, the vasa omphalo-meseraica (the future vena portæ), the umbilical vein from the collected venous radicles of the chorion, and the early trace of the umbilical arteries. These last named vessels ramify on a delicate membranous sac of an elongated form, which rises from the inferior or caudal extremity of the embryo, viz.: the *allantois*; whether this is formed by a portion of the mucous layer of the germinal vesicle, in common with the other abdominal viscera, appears to be still uncertain; in birds this may be very easily demonstrated as a vascular vesicle arising from the extremity of the intestinal canal; and in mammalia, connected with the bladder by means of a canal called

FIG. 38.

B. Is a portion of the Convexity of the Amnion, upon which at A, is the Fundus of the diminutive Human Allantois.

C. The Duct of the Vesicula Umbilicalis, dividing into two intestinal portions; and besides this duct are two vessels which are distributed upon the Vesicula Umbilicalis and form a reticular Anastomosis with each other.—From Baer.

urachus; from its sausage-like shape, it has received the name of *allantois*.

“The existence of an allantois in the human embryo has been long inferred from the presence of a ligamentous cord, extending from the fundus of the bladder to the umbilicus, like the *urachus* in animals. But from the extreme delicacy of the allantois, and from its functions ceasing at a very early period, it had defied all research, until lately, when it has been satisfactorily demonstrated in the human embryo by Baër and Rathke. It occupies the space between the chorion and amnion, and gives rise occasionally to a collection of fluid between these membranes, familiarly known by the name of the *liquor amnii spurius*, which, strictly speaking, is the *liquor allantoidis*.

“The function of the allantois is still in a great measure unknown. In animals it evidently acts as a species of *receptaculum urinæ* during the latter periods of gestation; but it is very doubtful if this be its use during the earlier periods. It does not seem directly connected with the process of nutrition, which at this time is proceeding so rapidly, first by means of the albuminous contents of the *vitellus*, or *vesicula umbilicalis*, and afterward, by the absorbing radicles of the chorion; but, from analogy with the structure of the lower classes of animals, it would appear that it is intended to produce certain changes in the rudimentary circulation of the embryo, similar to those which, at a later period of pregnancy, are effected by means of the placenta, and after birth, by the lungs, constituting the great functions of respiration.

“In many of the lower classes of animals respiration (or at least the functions analogous to it) is performed by organs situated at the inferior or caudal extremity of the animal; thus, for instance, certain insect tribes, as in *hymenoptera*, or insects with a sting, as wasps, bees, etc.; in *diptera*, or insects with two wings, as the common fly; and also the spider tribe, have their respiratory organs situated in the lower part of the abdomen. In some of the *crustacea*, as, for instance, the shrimp, the organs of respiration lie under the tail, between the fins, and floating loosely in the water. Again, some of the *mollusca*, viz.: the cuttlefish, have the respiratory organs in the abdomen. We also know that many animals, during the first periods of their lives, respire by a different set of organs to what they do in the adult state; the most familiar illustration of this is the frog, which, during its tadpole state, lives entirely in the water.

“As the growth of the embryo advances, other organs, whose function is as temporary as that of the allantois, make their appearance:

these also correspond to the respiratory organs of a lower class of animals, although higher than those to which we have just alluded—we mean branchial processes, or gills. (*Fig. 39.*) It is to Professor Rathke (*Acta Naturæ Curios.*, vol. xiv), that we are indebted for pointing out the interesting fact, that several transverse, slit-like apertures may be detected on each side of the neck of the embryo, at a very early stage of development. In the chick, in which he first observed it, it takes place about the fourth day of incubation: at this period the neck is remarkably thick, and contains a cavity which communicates inferiorly with the esophagus and stomach, and opens externally on each side by means of the above-mentioned apertures, precisely as is observed in fishes, more especially the shark tribe; these apertures are separated from each other by lobular septa, of exceedingly soft and delicate structure. Rathke observed the same structure in the embryo of the pig, and other mammalia: and Baër has since shown it distinctly in the human embryo. It is curious to see how the vascular system corresponds to the grade of development then present: the heart is single, consisting of one auricle and one ventricle; the aorta gives off four delicate, but perfectly simple branches, two of which go to the right, and two to the left side: each

FIG. 39.

of these little arteries passes to one of the lobules, or septa, at the side of the neck, which correspond to gills, and having again united with three others, close to what is the first rudiment of the vertebral column, they form a single trunk, which afterward becomes the abdominal aorta. In a short time these slit-like openings begin to close; the branchial processes or septa become obliterated, and indistinguishable from the adjacent parts; the heart

loses the form of a single heart; a crescentic fold begins to mark the future division into two ventricles, and gradually extends until the septum between them is completed. It is also continued along the bulb of the aorta, dividing it into two trunks, the aorta proper, and pulmonary artery: at the upper part the division is left incomplete, so that there is an opening from one vessel to the other, which forms the

A. Branchial Processes.	D. Allantois.
B. Vesicula Umbilicalis.	E. Amnion.
C. Vitellus.	From Baer.

ductus arteriosus.* A similar process takes place in the auricles, the foramen ovale being apparently formed in the same manner as the ductus arteriosus; these changes commence in the human embryo about the fourth week, and are completed about the seventh.

"At first the body of the embryo has a more elongated form than afterward, and the part which is first developed is the trunk, at the upper extremity of which a small prominence, less thick than the middle part, and separated from the rest of the body by an indentation, distinguishes the head. There are as yet no traces whatever of extremities, or of any other prominent parts; it is straight, or nearly so, the posterior surface slightly convex, the anterior slightly concave, and rests with its inferior extremity directly upon the membranes, or by means of an extremely short umbilical cord.

"The head now increases considerably in proportion to the rest of the body; so much so, that at the beginning of the second month,

FIG. 40.

it equals nearly half the size of the whole body: previous to, and after this period, it is usually smaller. The body of the embryo becomes considerably curved, both at its upper as well as its lower extremity, although the trunk itself still continues straight. The head joins the body at a right angle, so that the part of it which corresponds to the chin is fixed directly upon the upper part of the breast; nor can any traces of neck be discerned, until nearly the end of the second month. (*Fig. 40.*)

DIAGRAM OF THE FETUS AND MEMBRANES, ABOUT THE FOURTH WEEK.

- A. *Vesicula Umbilicalis*, already passing into the ventricular and rectum intestine at G
- B. *Vena and arteria Omphalo-mesenterica.*
- C. *Allantois* springing from the pelvis with the Umbilical Arteries.
- D. *Embryo.*
- E. *Amnion.*
- F. *Chorion — From Corpus.*

"The inferior extremity of the vertebral column, which at first resembles the rudiment of a tail, becomes shorter toward the middle of the third month, and takes a curvature forward under the rectum. In the fifth week the extremities become visible, the upper usually somewhat sooner than the lower, in the form of small blunt prominences—the upper close under the head, the lower near the caudal extremity of the vertebral column. Both are turned somewhat outward, on account of the size of the abdomen; the upper are usually directed somewhat downward, the lower ones somewhat upward.

* In making these observations upon the formation of the ductus arteriosus, we must request our readers to consider this as still an unsettled question.

"The vesicula umbilicalis may still be distinguished in the second month as a small vesicle, not larger than a pea, near the insertion of the cord, at the navel, and external to the amnion. From the trunk, which is almost entirely occupied by the abdominal cavity, arises a short, thick umbilical cord, in which some of the convolutions of the intestines may still be traced. Beside these, it usually contains, as already observed, the two umbilical arteries and the umbilical vein, the urachus, the vasa omphalo-mesenterica, or vein and artery of the vesicula umbilicalis, and perhaps, even at this period, the duct of communication between the intestinal canal and vesicula umbilicalis, the fetal extremity of which, according to Professor Oken's views, forms the processus vermiformis.

"The hands seem to be fixed to the shoulders without arms, and the

FIG. 41.

A

A

DIAGRAM OF THE FETUS AND MEMBRANES, ABOUT THE SIXTH WEEK.

- | | |
|--|--|
| A. Chorion. | G. Communicating Canal between the Vesicula Umbilicalis and Intestine. |
| B. The larger Absorbent Extremities, the Site of the Placenta. | H. Vena Umbilicalis. |
| C. Allantois. | I. Arteriae Umbilicalis. |
| D. Amnion. | K. Arteriae Omphalo-mesenterica. |
| E. Urachus. | L. Vena Omphalo-mesenterica. |
| F. Bladder. | N. Heart. |
| F. Vesicula Umbilicalis. | O. Rudiment of Superior Extremity. |
| | P. Rudiment of Lower Extremity.—From Cuvier. |

feet to adhere to the ossa ilii; the liver seems to fill the whole abdomen; the ossa innominata, the ribs, and scapulæ, are cartilaginous.

"In a short time, the little stump-like prominences of the extremities become longer, and are now divided into two parts. the

superior into the hand and the fore-arm, the inferior into the foot and leg; in one or two weeks later, the arms and thighs are visible. (*Fig. 41.*) These parts of the extremities, which are formed later than the others, are at first smaller, but as they are gradually developed they become larger. When the limbs begin to separate into an upper and lower part, their extremities become rounder and broader, and divided into the fingers and toes, which at first are disproportionately thick, and until the end of the third month are connected by a membranous substance analogous to the webbed feet of water-birds; this membrane gradually disappears, beginning at the extremities of the fingers and toes, and continuing the division up to their insertion. The external parts of generation, the nose, ears, and mouth, appear after the development of the extremities. The insertion of the umbilical cord changes its situation to a certain degree; instead of being nearly at the inferior extremity of the fetus, as at first, it is now situated higher up, on the anterior surface of the abdomen. The comparative distance between the umbilicus and pubis continues to increase, not only to the full period of gestation, when it occupies the middle point of the length of the child's body, as pointed out by Chaussier, but even to the age of puberty, from the relative size of the liver becoming smaller.

“Though the head appears large at first, and for a long time continues so, yet its contents are tardy in their development, and until the sixth month the parietes of the skull are in a great measure membranous or cartilaginous. Ossification commences in the base of the cranium, and the bones under the scalp are those in which this process is last completed.

“The contents of the skull are at first gelatinous, and no distinct traces of the natural structure of the brain can be identified until the close of the second month; even then it requires to have been some time previously immersed in alcohol to harden its texture. There are many parts of it not properly developed until the seventh month. In the medulla spinalis no fibers can be distinguished until the fourth month. The thalami nervorum opticorum, the corpora striata, and tubercula quadrigemina, are seen in the second month; in the third, the lateral and longitudinal sinuses can be traced, and contain blood. In the fifth we can distinguish the corpus callosum; but the cerebral mass has yet acquired very little solidity, for until the sixth month it is almost semi-fluid. (*Campbell's System of Midwifery.*)

“About the end of the third, during the fourth, and the beginning of the fifth months, the mother begins to be sensible of the move-

ments of the fetus. These motions are felt sooner or later, according to the bulk of the child, the size and shape of the pelvis, and the quantity of fluid contained in the amnion; the waters being in larger proportionate quantity the younger the fetus.

“The secretion of bile, like that of the fat, seems to begin toward the middle of pregnancy, and tinges the meconium, a mucous secretion of the intestinal tube, which had hitherto been colorless, of a yellow color. Shortly after this the hair begins to grow, and the nails are formed about the sixth or seventh month. A very delicate membrane (*membrana pupillaris*), by which the pupil has been hitherto closed, now ruptures, and the pupil becomes visible. The kidneys, which at first were composed of numerous glandular lobules (seventeen or eighteen in number), now unite, and form a separate viscus on each side of the spine; sometimes they unite into one large mass, an intermediate portion extending across the spine, forming the horseshoe kidney.

“Lastly, the testes, which at the first were placed on each side of the lumbar vertebræ, near the origin of the spermatic vessels, now descend along the iliac vessels toward the inguinal rings, directed by a cellular cord, which Hunter has called *Gubernaculum testis*: they then pass through the openings, carrying before them that portion of the peritoneum which is to form their *tunica vaginalis*.

“The length of a full-grown fetus is generally about eighteen or nineteen inches; its weight between six and seven pounds. The different parts are well developed and rounded; the body is generally covered with the *vernix caseosa*;* the nails are horny, and project beyond the tips of the fingers, which is not the case with the toes; the head has attained its proper size and hardness; the ears have the firmness of cartilage; the scrotum is rugous, not peculiarly red, and usually containing the testes. In female children, the nymphæ are generally covered entirely by the labia, the breasts project, and in both sexes frequently contain a milky fluid. As soon as a child is born, which has been carried the full time, it usually cries loudly, opens its

*The *vernix caseosa* is a viscid, fatty matter, of a yellowish-white color, adhering to different parts of the child's body, and in some cases in such quantity as to cover the whole surface; it seems to be a substance intermediate between fibrine and fat, having a considerable resemblance to spermaceti. From the known activity of the sebaceous glands in the fetal state, and from the smegma being found in the greatest quantity about the head, armpits, and groins, where these glands are most abundant, there is every reason to consider it as the secretion of the sebaceous glands of the skin during the latter months of pregnancy.

eyes, and moves its arms and legs briskly; it soon passes urine and fæces, and greedily takes the nipple. (Nægelè's *Hebammenbuch*.)

"Thus then, in the space of forty weeks, or ten lunar months, from an inappreciable point, the fetus attains a medium length of about eighteen or nineteen inches, and a medium weight of between six and seven pounds."

CHAPTER XVI.

POSITION, NUTRITION, RESPIRATION, CIRCULATION, DIMENSIONS, AND DEATH OF THE FETUS—SUPERFETATION.

It was formerly believed that the fetus in utero maintained a sitting position during the early months of pregnancy, and that as it progressed in its development, the superior weight of the head, effected a revolution, so that at the latter period of pregnancy its position was reversed, the head being downward; but this is incorrect, the position of the intra-uterine fetus remains unaltered from the commencement to the termination of gestation, no matter what may have been its primary or original position. Its usual position is with the head downward, the most dependent part being the vertex; the head is flexed forward so that the chin rests on the anterior superior portion of the breast; the thighs are drawn up toward the abdomen, with the knees apart from each other, and thrown upward so as to strongly flex the legs on the posterior surface of the thighs; the heels approximate at the posterior part of the thighs, the feet being usually crossed; the arms rest upon the sides of the thorax, while the fore-arms are flexed and crossed in front of the sternum; the neck and back are bent forward into a curve. In this position it constitutes an oval figure, whose long diameter is about eleven inches, and forms a line nearly parallel with the long diameter of the uterus; and we can not conceive of a more easy and compact position for such an irregular and bulky body.

The cause of the dependent position of the head, which is by far more common than any other, has given rise to much speculation; it has been supposed to be the result of gravitation—that the fetus being suspended by the umbilical cord, its heaviest extremity, the cephalic, would naturally fall downward. Again, it has been stated to depend upon the instinctive will of the fetus itself, which assumes the position as the most convenient for its intra-uterine existence, and as the most advantageous for an easy expulsion. Various other reasons have been

given, but none of them are satisfactory, and the subject remains in as much obscurity as ever.

The principal functions of the fetus while in its intra-uterine condition, are nutrition, respiration, and circulation, upon each of which a brief notice will be bestowed. In relation to the first, *nutrition*, many hypotheses have been advanced; it is at present supposed that during the early embryonic life, nourishment is accomplished by superficial imbibition, or probably by absorption through the villi of the chorion, and that its sources are, at first, the vitellus, or the liquid in the umbilical vesicle, and perhaps the albuminous matter existing between the amnion and chorion; the amniotic liquid, after its formation, is also considered to contribute much toward this end, as it contains several nutrient principles. It is probably absorbed by the cutaneous surface, for acephalous fetuses, and those with the natural mucous orifices closed, as well as those which have been born without a placenta or umbilical cord, have been, with these exceptions, as well developed as the perfectly-formed fetus. It has also been stated that this fluid is probably swallowed, or conveyed into the digestive tube, from the fact that hair and portions of epithelium have been found mixed with it in the stomach; and the meconium is supposed to be the result of digestion. It has also been suggested by Dr. Montgomery, that the milky liquid in the decidual cotyledons, may assist in the nourishment of the fetus. The placenta has likewise been thought to assist during the latter months of pregnancy, but this is rather designed for hematoxis than nutrition, and acts as a substitute for the undeveloped lungs of the fetus, somewhat in the manner of the gills of fishes, whose blood is aërated by the water passing through them. It must be remembered that fetal nutrition has continued in instances where the liquor amnii had been evacuated for weeks, which would seem to indicate some other source of nutrition; beside, although meconium, hair, etc., have been found in the digestive tube, still it appears to me that the function of deglutition must be very difficult to perform in cases where inspiration and expiration are absent, as with the fetus. It will thus be seen that the subject of fetal nutrition is involved in great obscurity.

By FETAL RESPIRATION, is meant, not the inhalation and exhalation of atmospheric air, such as takes place after birth, but the phenomenon by which the blood in the placenta is modified to suit it for the purposes of fetal life. As with the function of nutrition, this

is also an unsettled and incomprehensible subject. It is supposed, that although the placenta may be the medium by which a vivifying principle is taken from the maternal blood and conveyed to the fetal, yet the materials which form in the latter and become unsuited to nutrition, are not removed by the placenta alone, but principally by the liver, which employs the superabundance of carbon and hydrogen to form bile, as well as to aid in perfecting its own development. Respiration and nutrition appear to exist together, acting in harmony, without disturbing each other, and both being probably performed through a similar means, that of absorption.

In the FETAL CIRCULATION, there are several anatomical peculiarities, not existing in the adult, which it may be proper to notice: 1. There is a vein termed the *ductus venosus*, which is situated at the thick edge of the liver, and communicates between the umbilical vein and the vena cava ascendens or inferior vena cava; after birth this vein contracts, closes on the seventh day, and becomes obliterated. 2. In the center of the septum, between the auricles, is an oval aperture, called the *foramen ovale* or *foramen of Botal*; this is furnished with a valve, which it is stated allows the blood from the vena cava ascendens to pass into the left auricle, without mingling with the blood of the vena cava descendens; after birth, this closes, rarely persisting beyond seven or eight days—occasionally it remains unclosed during life, giving rise to a morbid condition known as *morbus cœruleus*. 3. Soon after the origin of the pulmonary artery, a branch is given off, which communicates between this artery and the aorta, entering this latter just below its transverse arch; it is called the *ductus arteriosus*, and after birth gradually closes and becomes obliterated. 4. The *umbilical arteries* and *umbilical vein* have been already referred to.

The fetal circulation is entirely independent of that of the mother, its blood resembles venous blood, being of a uniform dark color, and becoming of a bright florid tint as soon as exposed to the atmosphere; it contains less fibrin than adult blood, but coagulates on standing; no difference can be perceived between the color of the fluid passing in the umbilical arteries and that in the umbilical vein. Under the microscope it presents corpuscles, resembling those seen in the blood of an adult.

The course of the circulation is as follows: The blood is conveyed from the ramifications of the umbilical vein in the placenta to this vein; through which it passes, traversing its whole length, to the

umbilicus; as soon as it has entered into the abdomen through the umbilical ring, it proceeds to the longitudinal sinus, or fissure of the liver, where a portion of it flows into the ductus venosus which conveys it immediately to the vena cava ascendens; while the remainder passes through the vena portæ into the liver, circulates through it, and flows into the hepatic veins where it is collected and also emptied into the vena cava ascendens just as it is traversing the diaphragm. It is from thence conducted, together with the blood conveyed through the ductus venosus, to the right auricle of the fetal heart, where it is prevented from mixing with the venous blood from the vena cava descendens by the curtain-like eustachian valve, which conducts it through the foramen ovale into the left auricle, and then into the left ventricle, which throws it into the ascending aorta, through which it is distributed to all parts of the body, but especially to the head and superior extremities. The venous blood carried by the vena cava descendens into the right auricle is at the same time directed by the eustachian valve into the right ventricle.

The arterial blood having supplied the superior parts of the fetus, it returns from these parts through the jugular and axillary veins, passes into the subclavians, and then into the vena cava descendens, through which it flows into the right auricle, then into the right ventricle, and, together with that portion which passed into the right ventricle without having entered into the foramen ovale, is thrown into the pulmonary artery, from which a portion is conveyed to the lungs, while the major part passes through the ductus arteriosus into the descending aorta, where it mixes with the blood from the left ventricle, not required for the head and superior extremities, and flows along with it to the descending aorta. That portion which entered the lung through the pulmonary artery returns by the pulmonary veins to the left auricle, and thence to the left ventricle, and into the descending aorta, where it mixes as just stated above. A part of the blood in the descending aorta is distributed to the viscera and inferior extremities, while the larger portion returns to the placenta, through the umbilical arteries, there to be revived, and be again taken up by the umbilical vein to traverse the same route as before. (*Fig. 42.*)

From this arrangement of the circulation it will be seen that the blood with which the head and superior extremities are furnished, is nearly fresh and pure from the placenta, while that flowing through the inferior parts of the fetus, having previously circulated through the system, must be less pure; and this may, probably, be a reason why

FIG. 42.

DIAGRAM OF THE FETAL CIRCULATION.

1. Umbilical Cord, consisting of the Umbilical Vein, and two Umbilical Arteries.
2. Placenta.
3. Umbilical Vein dividing into three branches.
4. Two branches of the vein to be distributed to the Liver.
5. Ductus Venosus, or third branch of the Umbilical Vein.
6. Inferior Vena Cava into which the Ductus Venosus enters.
7. Portal Vein, which returns the blood from the Intestines, and unites with the right Hepatic branch.
8. Right Auricle, through which the blood passes to the left Auricle.
9. Left Auricle.
10. Left Ventricle, through which the blood passes to the arch of the Aorta.
11. Arch of the Aorta, from which the blood is distributed, through its branches, to the head and upper extremities.
12. The Arrows represent the return of the blood from the head and superior extremities through the Jugular and Subclavian Veins to
13. The Superior Vena Cava, to the right Auricle, and in the course of the Arrow, through
14. The Right Ventricle to
15. The Pulmonary Artery.
16. The Ductus Arteriosus, a proper continuation of the Pulmonary artery; the commencement of the right and left Pulmonary Artery, are seen on each side.
17. The descending Aorta, joined above by the Ductus Arteriosus; further down it divides into the common Iliacs, which become the Umbilical Arteries.
18. The Umbilical Arteries which return the blood along the cord to the Placenta, while the External Iliacs are continued to the lower extremities.
19. The External Iliacs, the Arrows making the return of the venous blood by the Veins to the Inferior Cava. (*Neill and Smith.*)

the head and superior extremities are more rapidly developed than the inferior portions of the fetus.

Previous to birth, the proper functions of the lungs are not required, and they are small, dense, firm, and unaërated, being nourished by small branches passing from the pulmonary artery; but after birth, considerable change ensues, the lungs become more or less inflated with atmospheric air, and pulmonary circulation is established. The foramen ovale is closed by the valve perfected for this purpose, which closure propels all the blood, entering the right auricle, from the ascending and descending cava, immediately into the right ventricle; from thence it is propelled into the pulmonary ar-

teries (which increase in diameter), and passes into the lungs, where, from the action of the atmospheric oxygen, it is converted into arterial blood. The ductus arteriosus being now useless, gradually contracts and disappears. The blood from the inferior extremities, not being able to pass through the umbilical arteries, flows through the vena cava ascendens into the right auricle and ventricle of the heart, thence, as above, into the lungs, and the circulation becomes changed from that of the intra-uterine to that of the extra-uterine or adult. In addition, other changes also occur, the liver becomes more active, the excretory functions of the kidneys and intestinal canal become established, and proper digestion of the food received into the stomach takes place.

The *dimensions, appearances, and weight* of the fetus at different periods of its intra-uterine development, have been somewhat accurately ascertained by various investigators; and as it is not only a matter of mere curiosity, but frequently, one of great practical importance, in a medico-legal sense, to determine the age of the expelled fetus, it is necessary that the student should be informed on these points. The following summary of statements of various observers are therefore presented:

The first distinct microscopic view which can be had of the embryo is about the *third or fourth week*; it is oblong, swollen in the middle, bluntly pointed at one extremity, obtuse at the other, and is slightly curved forward; it is semi-opaque, of a gelatinous consistence, grayish-white color, varying from two to five lines in length, and weighing one or two grains. It is surrounded by the amnion, and has a vermiform or serpent-like appearance. Its head appears as a small tubercle, separated from the body by a notch; its mouth is indicated by a cleft; its rudimentary eyes by two black points; its caudal extremity is slender, and a white line may be observed in it, which indicates the continuation of the medulla spinalis. The members present nipple-like protuberances; the liver occupies the whole abdomen, the cavity of which is opened in front to a considerable extent; the umbilical vesicle is very large; the chorion is villous, the villousities being diffused over its whole surface.

At the *sixth week* (*Fig. 41*), its length is from nine to twelve lines; its weight from forty to seventy-five grains; and all its parts are distinct. The head has greatly increased, and is separated from the thorax by the depression of the neck; the eyes still appear as two dark spots; the mouth presents a small, triangular orifice; the face is

distinct from the cranium; the hands, fore-arms and fingers can be recognized; the clavicle and maxillary bone present a point of ossification; the legs and feet are situated near the anus, which remains closed; the umbilicus, for the attachment of the cord, may be observed, the cord consisting of the omphalo-mesenteric vessels, a portion of the urachus, a part of the intestinal tube, and of filaments, which represent the umbilical vessels; the formation of the placenta commences; the chorion and amnion are separated from each other; and the umbilical vesicle is very large. The divisions of the vertebræ can be seen, also the imperfect interventricular septum of the heart, and the lungs, which appear as five or six lobules, in which the bronchii may be distinguished terminating in somewhat swollen culs-de-sac. Extending from the lung to the bottom of the pelvis, along each side of the vertebral column, may be seen two glandular structures; these are the Wolffian bodies, or *false kidneys*, and are constituted of an excretory canal running through their whole length. Alongside of this canal may be observed another, which becomes, according to the gender of the new being, either the oviduct or the vas deferens. Both of these canals empty below into the transitory pouch or cloaca.

In early embryonic life may be seen on each side of the neck four transverse fissures; these open into the pharynx, are separated from each other by fleshy bands, and are analogous to the bronchial arcs of fishes. The aorta sends three or four branches to these fissures, but which, together with the fissures soon become obliterated, but two on the left side remaining, one of which becomes the arch of the aorta, while the other forms the common trunk of the pulmonary arteries; the first branchial fissure of each side also remains, and is converted into the external ear. The upper jaw is composed of a pimple or piece on each side, which gradually approximate and form a single body; the nostrils are each split down to the mouth, and are separated by the incisive pimples, but approach each other, and assume their proper form, as the pimples diminish in size; and if the progress of this development is arrested, hare-lip is the result.

At *two months*, the embryo is from one and a half to two inches in length, and weighs from three drachms to nearly an ounce; the head forms about one-third of it, the eyes are prominent but not yet covered by the lids, which are still rudimentary; the nose forms an obtuse eminence, with rounded and separated nostrils; the mouth is gaping; the elbows and fore-arms are detached from the trunk, and the fingers are isolated, or adhere by a transparent gelatinous substance; the rudimentary shoulder and hips are just observable; the penis or

clitoris is apparent, but can not readily be distinguished from each other, on account of the length of the latter. The anus forms a small conical projection, but is imperforate, and its location is marked by a dark spot; the rudiments of the lungs, spleen, and supra-renal capsules are observed; the cœcum is placed behind the umbilicus; the digestive tube is withdrawn into the abdomen; the urachus is visible; osseous points are apparent in the frontal bone and in the ribs; the chorion commences to come in contact with the amnion at the point opposite the insertion of the placenta, which now begins to assume its regular form; the cord is inserted low down in the abdomen, is infundibuliform in shape, and four or five lines in length, and the umbilical vessels commence their spiral twisting; its base contains a portion of intestine. The umbilical vesicle begins to disappear. The epidermis is distinguishable.

At *ten weeks*, the embryo is from one and a half to two and a half inches in length, and weighs an ounce, or an ounce and a half; the eye-lids are apparent and cover the eyes, and the lachrymal puncta are visible; the hips commence to develop themselves, and the buccal fissure begins its obliteration. The parietes of the thorax are seen, and the motions of the heart are no longer visible; the fingers are distinct, and the toes appear as tubercles united by some soft substance; the cord assumes the spiral appearance, is longer than the embryo, is less infundibuliform, is not inserted so low down, and still contains a portion of intestine.

At *three months*, the embryo is from two and a half to five or six inches in length, and weighs from an ounce and a half to three or four ounces; the head is voluminous, but bears a better proportion to the rest of the body; the eyelids are very distinct, and are in contact by their free margins; the pupillary membrane is visible; the nose projects; the mouth is closed but perfectly delineated; the thorax is well formed; the fingers are completely separated, and the nails present the appearance of thin membranous plates; the inferior extremities are of greater length than the rudimentary tail; the clitoris and penis are very long, but the sex may frequently be discriminated by a longitudinal fissure, the edges of which form the labia pudenda; the thymus gland, as well as the supra-renal capsules are present; the cœcum is placed below the umbilicus; the cerebrum is five lines in diameter, the cerebellum four, the medulla oblongata one and a half, and the medulla spinalis three-fourths of a line; the two ventricles of the heart are distinct; the decidua reflexa and vera come in contact; the cord contains a little of the gelatin of Wharton, and

umbilical vessels which twist and form long spiral turns; the placenta becomes completely isolated, and the allantois, umbilical vesicle, and omphalo-mesenteric vessels have disappeared.

At *four months*, the embryo takes the name of Fetus. Its length is from five to eight inches, and its weight from three to seven or eight ounces. The skin is rosy, tolerably dense, and begins to be covered with down; and a sensible motion may be perceived in the muscles. The fontanelles and sutures are very large, and sometimes whitish hairs may be seen on the head; the face is elongated but imperfectly developed; the eyes, nostrils, and mouth are closed, and the tongue and projection of the chin are observable; the membrana pupillaris is very evident; the nails become more developed; the sex may be recognized; the cœcum is placed near the right kidney; the gall-bladder commences to appear; meconium is found in the duodenum; the cœcal valve is visible; the umbilicus is placed near the pubis; the ossicula auditoria are ossified; the superior part of the sacrum presents points of ossification; the decidua serotina is formed; and the chorion and amnion are in close contact with each other. A fetus born at this period might live for several hours.

At *five months*, the length of the fetus is from seven to ten inches, and its weight from seven to twelve ounces. The head is still large, with appearances of hair; white substance in the cerebellum; the nails are very distinct; the skin is more consistent, frequently presenting patches of sebaceous matter; the heart and kidneys are very voluminous; the cœcum is situated at the inferior part of the right kidney; the gall-bladder is distinct; points of ossification are manifest in the pubis and heel; germs of permanent teeth appear; the meconium has a yellowish-green tint, and occupies the commencement of the large intestine; the umbilical cord is longer.

At *six months*, the length of the fetus is from ten to twelve and a half inches, and its weight from twelve ounces to a pound. The liver is large and red, some fluid in gall-bladder. The hair is longer and thicker, white or silvery; the face of a purplish-red; the eyelids somewhat thicker but still in contact, the pupillary membrane also remains, and the eyebrows are filled with delicate hairs. The skin is better organized, presenting some appearance of fibrous structure, and sebaceous covering; the nails are solid; sacculi begin to appear in the colon; the cord is inserted a little above the pubis; the scrotum is very small, quite red, and empty, the testes being near the kidneys; points of ossification are developed in the divisions of the sternum.

At *seven months*, the fetus is from twelve and a half to fourteen

inches in length, and weighs three or four pounds. All its parts are more perfectly developed and better proportioned; the brain possesses more consistency; the skin is rosy, thick and fibrous, with sebaceous covering; the eyelids are partly open; the pupillary membrane disappears; the iris commences as a simple ring, which increases in a concentric manner, ultimately leaving an opening called the pupil; the nails have not yet reached the extremities of the fingers; a point of ossification is observed in the astragalus; the left lobe of the liver is nearly as large as the right; the gall-bladder contains bile; nearly the whole of the large intestine is filled with meconium; valvulæ conniventes begin to appear; the cœcum is placed in the right iliac fossa; the testicles leave the kidneys and approach the inguinal ring.

At *eight months*, the fetus is from fourteen to sixteen or eighteen inches in length, and weighs four or five pounds. The skin is very red, covered with long down, and a quantity of sebaceous matter, called the *vernix caseosa*, or *smegma*, which is a secretion of the fetal skin, and is found more abundantly on some fetuses than on others; it is a fat, slippery, viscous substance, of a yellowish-white color, is insoluble in water, alcohol or oil, and only partially soluble in potash, and is apparently of service, during labor, by aiding to facilitate the expulsion of the fetus. The pupillary membrane disappears; convolutions appear in the brain; the inferior maxillary bone, which was at first very short, is now as long as the superior; the nails are much firmer, and reach the extremities of the fingers; a point of ossification is observed in the last vertebra of the sacrum; no center of ossification is presented by the cartilage of the inferior extremity of the femur; the testicles descend into the internal ring, and one is usually contained in the scrotum; generally that on the left side; the hair of the head is much darker and longer.

At *full term*, the fetus is from sixteen to twenty-three inches in length, and weighs from five to seven, ten, and sometimes even twelve pounds, the average weight being about six and a half pounds. The head is covered with a greater or less quantity of hair, varying in length from six to twelve lines; the white and gray substances of the brain become distinct; convolutions well marked; the pupillary membrane no longer exists; four portions of the occipital bone remain distinct; the external meatus auditorius still remains cartilaginous; the os hyoides is not yet ossified; the skin is deep red, and covered with sebaceous matter, especially at the flexures of the joints; the liver descends to the umbilicus; the testes have passed the inguinal ring, and are frequently found in the scrotum; meconium is found at

the termination of the large intestine; the center of the cartilage at the lower extremity of the femur, exhibits a point of ossification.

A full developed fetus is characterized by a ready movement of the limbs, an ability to cry, and a capability of sucking; its mouth, eyelids, nostrils, and ears are open; the hair, eyebrows and nails are fully developed; the cranial bones are firm, and the edges of the fontanelles are not far apart, the body is of a clear red color; and the meconium is discharged within a few hours after birth. The meconium is a semi-fluid, of a dark green color at term, which is found in the fetal intestines, and is a mixture of bile with the secretions of the mucous membrane; some suppose it to be digested amniotic fluid.

An immature fetus may be known by its feeble motions, its small size, and incapability of sucking; its head is covered with down or sparingly with short hair; the bones are soft; the fontanelles widely separated; the skin is red with blue streaks; the nails are not perfected; the eyelids and mouth are closed; and the urination and defecation are imperfect.

As will be stated under Abortion, the fetus is liable to numerous diseases, some of which may be independent of the condition of the mother, while others occur secondarily through her. Cases of intermittent fever have occurred to the fetus where the mother was laboring under the disease; small-pox has attacked the fetus both where the mother was suffering with it, and in other instances where she was entirely exempt from it, and the same may be said of measles. Various cutaneous diseases have also attacked the fetus in utero, as well as hydrocephalus, pleurisy, abscesses of the lungs, œdema, scirrhus induration, tubercles, lobular pneumonia, calcareous deposition in the lungs, peritonitis, and enteritis. It is also especially liable to hypertrophy or atrophy, worms, calculus, dropsy, rickets, caries, and necrosis. Various forms of syphilitic disease are very apt to injure or destroy it, when the system of one or both parents is contaminated with the syphilitic virus. The heart, liver, kidneys, stomach, and other organs may become organically affected, and it is by no means uncommon to observe fractures and dislocations of various bones, which took place previous to birth. Previous to the expulsion of the fetus, it is impossible to detect any of these maladies, and even had we the means of doing so, it is very doubtful whether any curative or even palliative measures could be beneficially pursued; the greater part of them may be ascertained after its death and expulsion, and all the advantage to be derived from such information, at this time, is to

lead to the adoption of such measures as may prevent similar attacks in subsequent pregnancies.

The *signs* by which we may determine the *death of the fetus*, are frequently of great importance, especially in reference to the best time for obstetric operations, when these have to be performed. There are no signs upon which, separately, the accoucheur can positively determine a dead fetus; indeed its diagnosis is extremely difficult, and must be decided by the aggregate of symptoms present. These are named by Dr. Churchill, in his work on Obstetrics, as follows:

1. *The cessation of the fetal movements*; but these may be suspended for several days, and yet the fetus be alive.
2. *The subsidence or flaccidity of the abdomen*; this varies much during pregnancy, less tension being present in women who have had several children.
3. *The recession of the umbilicus*; but a dead fetus may remain in utero for months without this sign.
4. *The loose feel of the uterine tumor*.
5. *A rolling of the tumor in the abdomen*, and a *sensation of dead weight and coldness*; these may exist and yet the fetus be alive, the rolling may proceed from a loss of tone of the abdominal muscles—women who give birth to a living child, frequently complain of the uterine tumor feeling as a weight or foreign body; again, there is no appreciable difference between the temperature of a living fetus and that of a dead one—the coldness is a mere sensation that may be experienced independent of fetal death.
6. *The breasts suddenly become flaccid*, and their secretions suppressed; this rarely occurs from any cause save the death of the fetus.
7. *The health of the female becomes deteriorated*; but a dead fetus has frequently been retained for weeks or months without any change in the maternal health, beside the health may be impaired from other causes.
8. *Bad appetite, sunken countenance, a dark areola around the eyes; fetid breath, repeated rigors*; these are all minor signs, and may exist independent of pregnancy, or when occurring during its presence may be owing to causes not connected with the condition of the fetus; yet taken in connection with other signs they may become useful in aiding the diagnosis.

When the motions of the fetus have been very active up to the fifth, sixth or seventh month, or longer, and suddenly subside, and at the same time the breasts which had been firm and tense, become flaccid and decrease in size, while the abdomen loses its previous tense and rounded form, the uterine tumor becoming weighty and rolling loosely in the lower belly, we have almost a positive proof of the death of the fetus, which is rendered still more certain by the absence of the beating of the fetal heart. But, although much assistance may be

derived from the use of the stethoscope, yet it frequently proves uncertain, either from want of tact and experience on the part of the auscultator, or because the position of the fetus may be unfavorable to the transmission of sound to his ear, or the pulsations may be temporarily suspended. If, however, the pulsations have been distinctly heard on a previous occasion, and subsequently become suddenly or gradually inaudible, the evidence in favor of the death of the fetus, in connection with the other symptoms, is rendered unequivocal.

After the rupture of the membranes, there are other diagnostic symptoms of a more determinate character. 1. The liquor amnii becomes dark, thicker than usual, fetid, and bloody, especially where the fetus has been dead for some time; but it must be remembered that these conditions have been present with the living fetus. 2. When the death is not recent, having occurred some time previous to the examination, the scalp will feel emphysematous when the finger is pressed upon it, crepitating under the touch, and a portion of the cuticle will peel off; where the death is recent, the bones of the skull will overlap each other loosely, and the edges of the bones will convey a sensation of peculiar sharpness. These, together with the absence of pulsation at the anterior fontanelle, and its decrease from the collapse of the bones, are considered conclusive signs.

In *face presentations*, the flabby lips, flaccid and motionless tongue, and a slight swelling of the presenting part, are evidence of the child's death. In *breech presentations*, the finger can be readily introduced within the sphincter ani in case of death, which contracts and resists the finger, if the fetus be alive; the discharge of meconium is a symptom of no value. In an *arm presentation*, the pulse at the wrist may be imperceptible, the arm may become cold and livid, and yet the fetus be alive; but if the epidermis peel off, the child is dead. In *prolapse of the umbilical cord*, the absence of pulsation in it is usually regarded as conclusive evidence of the child's death; but this has occurred and the child been born alive.

Before closing this chapter, I will make a few remarks on *superfetation*, which subject has not been noticed in the preceding pages. By superfetation is meant, a second impregnation and conception, where the female is already pregnant. The early writers were impressed with the belief, that such an occurrence was possible, while among recent authors we find a difference of opinion. The reasons which have been advanced in its favor, are: 1. Females, at full term of pregnancy, sometimes give birth to a well-developed

fetus, and a blighted ovum at the same time; or, where the children are living, one of them will be more matured than the other. The disparity between them has afforded ground for belief that they were the products of different impregnations; but these cases do not prove superfetation, as it not unfrequently occurs that the development of one of the twins is retarded, or it may die and be expelled while the other is retained; and it is by no means uncommon for one twin to be larger and more matured than its fellow.

2. Cases have been recorded where the female has brought forth, at one parturition, two children, one of which was white, and the other black, or mulatto. But these cases have, so far as I know, been the result of two coitions, shortly succeeding each other, one with a white and the other with a black person. There is abundant evidence to prove that superfetation of this kind is possible at a very early period of pregnancy; impregnation having taken place before the canal of the cervix became closed by decidual membrane, or by the tough, gelatinous secretion of the glandulæ Nabothi. But after the formation of these substances, which effectually prevents any egress into the uterus, I do not believe that conception can occur, unless, indeed, there be some other route through which the semen can reach the impregnated ovum, independent of the uterine cavity, and Fallopian tubes.

3. Instances have been related where from three to four months after the delivery of a well-developed child, another child, fully matured, has been born. In some of these cases, the difficulty has been removed by the discovery of a double uterus. But where these circumstances have happened with but a single uterus present, if such in reality has ever occurred, the subject is involved in much obscurity. It may be that the development of one fetus progressed much more slowly than that of the other; and that when this latter was born, the uterine contractions not having destroyed the integrity of the membranes of the former, nor destroyed its utero-placental attachment, it continued to remain in utero, until its maturity again determined uterine action. It has also been supposed in cases of single uterus, that this organ may have been divided by a longitudinal septum, and thus impregnation could be effected in each at different periods; but this is as difficult to my mind as in the previous instance, unless it be admitted in each, that immaturity of the fetus favors protracted gestation, and that the contractions of the uterus to expel a full grown fetus, do not, necessarily, involve the immediate expulsion of another in utero, but imperfectly developed.

CHAPTER XVII.

CHANGES IN THE CONDITION OF THE UTERUS DURING PREGNANCY.

FROM the moment of conception, the uterus gradually undergoes a series of changes, in volume, form, situation, and direction, a knowledge of all of which is highly important to the accoucheur. These changes occur both in the neck, and in the body, each of which I will review individually.

CHANGES IN THE NECK OF THE UTERUS. As gestation proceeds, the congestion and ramollissement of the substance of the cervix gradually advances, until finally the whole neck becomes softened.

Toward the end of the *first month*, the lower or inferior portion of the cervix commences to undergo this change, which is principally confined to the mucous covering of the part, imparting to the finger a fungous softness, but through which deeper pressure will detect the firm consistency of the proper tissue. The softening always commences below and advances upward, gradually progressing, so that at the end of the *third month*, or commencement of the *fourth*, this modification extends into the substance of the lips, softening them through their whole thickness to the extent of a line and a half, and increasing as gestation progresses, until at the *sixth month* it embraces one-half of the vaginal projection of the neck. It continues to advance gradually upward during the last three months, until finally the whole cervix, together with the ring of the internal orifice becomes so softened, that at "term" it has occasioned, in the practice of the inexperienced physician, much difficulty in discriminating it from the vaginal walls. It may be proper for me to remark that, in five or six cases, I have encountered a cushiony, spongy sensation of the inferior portion of the uterine cervix, the patients not being pregnant, but laboring under abnormal conditions of the uterus.

This ramollissement of the neck is an important indication of pregnancy, being present at an early period, and is found in all females in whom the neck is in a normal condition; it likewise renders material assistance in determining the stage of pregnancy. But in the investigation of this last point, it must always be recollected that in females who have given birth to a number of children, the vaginal projection of the neck loses a considerable portion of its length, and

consequently, if one half of this projection has been lost, the softening will not commence in the lower extremity of the remaining portion, until the period at which it would have ensued, were the neck of its original extent, or at a period proportioned to the amount of length which has been lost. Thus, in a woman who has given birth to eight or ten children, the neck will vary very much in the extent of its softening at the sixth month, when compared with that of a female at the same stage of gestation, who has borne only two or three children. In primiparæ, or women with their first child, this softening progresses more slowly than in multiparæ, or women who have previously had children.

Beside the softening of the neck, it undergoes other modifications. During the early months of pregnancy it becomes thicker, with an increase of its volume, more especially at its superior portion; it is also found at a lower point within the vagina, inclined a little to the left, with the os tincæ looking more toward the pubis, and, as a larger extent of it can now be felt and examined by the finger, it has given rise to an erroneous impression that its length was likewise increased. At the fifth month the cervix looks more toward the sacrum, and still a little to the left, becomes more elevated and is difficult to reach; this elevation of the neck gradually increases as pregnancy advances, rendering it more and more difficult to reach, and which has, probably, led to the mistaken views of several authors, that the cervix became gradually shortened from the fifth month until "term," at which period it was completely effaced. The fact is, however, that there is no shortening of the neck until the ramollissement has occupied its whole extent, rendering it yielding and incapable of resistance, which generally commences in the last fortnight of pregnancy, and during the last few days, both in primiparæ and multiparæ, and then in consequence of uterine action at the time of labor (pressure of the bag of waters and of the fetal head) it dilates, shortens, and disappears, forming, for the time being, a part of the uterine sphere. As the neck ascends, looking backward and to the left, the fundus is nearly always carried forward and to the right.

Perhaps, it would be proper to remark, that in primiparæ, toward the seventh month, there exists a slight diminution of the length of the cervix, but which does not materially affect the correctness of the above statement; this shortening is occasioned by the spindle shape assumed by the cervix at this period, or a bulging of its central part, which necessarily causes a slight approximation of the

external and internal orifices of the neck. This does not happen in multiparæ.

The form of the cervix is different in primiparæ and multiparæ, during gestation. Among the former it will be found more pointed and contracted at its inferior extremity, and enlarged at its superior, and the os tincæ changes from a hardly perceptible transverse fissure, to one of a circular form, though it is seldom, if ever, opened, until dilatation occurs during labor. About the seventh month, the walls of the neck having become softened, they readily yield to the pressure of the secretions from their internal surface, and as the os tincæ remains closed, the central portion of the canal of the cervix is pressed outward, which gives to the whole neck a fusiform appearance. The external surface remains smooth and polished, and the os tincæ regular and rounded, without any roughness or inequalities; the circumference is sometimes soft, and occasionally, during the latter

FIG. 43.

FIG. 44.

FIG. 45.



These Figures show the softening and opening of the cervix uteri, as pregnancy advances; also, how the finger ultimately gets into direct contact with the naked membranes.

months, presents a sharp and thin border. Among multiparæ, the form of the cervix is quite different, somewhat resembling a thimble, with its small extremity upward, its orifice instead of being closed is opened sufficiently to admit the extremity of the finger, and its periphery is very irregular on account of numerous cicatrizations and fissures, the results of previous lacerations. As the softening advances upward, the opening of the os tincæ and inferior portion of the cavity of the neck simultaneously continues to increase, so that each month the finger may penetrate deeper into this thimble-shaped, and sometimes funnel-shaped cavity. Toward the ninth month, the second phalanx of the finger can be introduced within this opening, its free extremity being arrested by the closed and puckered ring at the internal orifice, which finally softens and dilates, allowing the finger to pass through the cavity of the neck, and to come in direct contact with the membranes. At this period the canal through which the finger passes,

instead of being shortened, will be found to vary from one inch, to an inch and a half in length. (*Figs. 43, 44, 45.*)

The softening and spreading out of the neck is said to be greatly accelerated by frequent touchings or examinations during pregnancy, and occasionally the internal orifice opens at too early a period, even in the seventh month, especially among those women who are subject to floodings.

It is sometimes the case, that the presenting part of the fetus, in engaging in the excavation, presses the anterior inferior portion of the uterus before it, which, in a large pelvis, may even descend to the inferior floor, occasioning much embarrassment to the inexperienced practitioner, who not being able to ascertain the situation of the os tincæ, might erroneously suppose it to be imperforate. It will be readily seen that, as the portion of the uterus mentioned is pushed downward, the neck will be carried behind it, with the os tincæ looking toward the anterior face of the sacrum, and much difficulty may be experienced in gaining access to it; but when once reached, the finger must be bent like a hook and introduced into its cavity from behind directly forward, pulling the neck by its anterior lip down toward its normal location at the center of the cavity, while at the same time, efforts may be made with the other hand on the abdomen, or by means of an assistant, to elevate or push the body of the uterus upward and backward. While the womb remains in this mal-position, it will be impossible for delivery to be accomplished until the above change in its direction is effected; and when effected, if the female has been long in labor, with evident symptoms of dangerous exhaustion, the os uteri *soft and dilated or dilatable*, and *the head at the superior strait*, my own experience is in favor of at once terminating the labor by turning and delivering by the feet, at the same time administering sufficient stimuli to sustain the sinking powers of the system. This is the course I have adopted in three instances of similar character, and in each of which success crowned my efforts, with the exception of one child being still-born.

PHYSICAL CHANGES IN THE BODY OF THE UTERUS,
etc. In the non-gravid state, the uterus may be said to be in an inactive or dormant condition, from which it is suddenly aroused by conception, and becomes more susceptible, with increased temperature and swelling, from the greater sanguineous determination toward it. The *volume* of the uterine walls increases in every direction, and the *uterine cavity* enlarges, which enlargement is maintained by the new

formation called the *caducous membrane*, and which is present long before the impregnated ovum reaches the uterine cavity. As soon as the ovule has reached the uterus, the increase of volume or development of the embryo, continues and progresses until the moment of parturition, being more rapid in the latter than in the early months.

The *shape* of the uterus is not materially changed during the first month of pregnancy, but subsequently, as its volume augments, from being flattened from before backward, it gradually grows rounder, assumes the shape of a pear, or gourd, then spheroidal, until toward the termination of gestation, it becomes of an ovoid form, slightly flattened in its antero-posterior diameter, with its anterior face more convex, and its posterior somewhat concave, to adapt itself to the projection of the lumbar vertebræ.

The *situation* of the uterus must necessarily vary in proportion to its increasing size and shape; thus, we find that during the first three months of pregnancy it is lower in the vagina, or pelvic cavity, with the os tincæ a little inclined to the left, and thrown forward to the pubis; but after this period it gradually rises from the excavation into the abdominal cavity, pushing the opposing contents of this cavity before it. From a knowledge of the various points at which the fundus is located, we may, by palpation, be enabled to determine the period of gestation; thus, at the *fourth* month, it will be found two or three fingers' breadth above the pubis; at the *fifth* month, it will be found within one finger's breadth of the umbilicus; the hypogastrium projects and is rounded, the vagina is elongated and narrowed, and the motions of the fetus are felt; the cervix is more elevated, is turned upwardly, and is more difficult to reach; from the fifth to the sixth month, the fundus passes the umbilicus, and, at the *sixth* month, is found half an inch above this depression, which now begins to project beyond the integuments; the vagina still farther elongated and narrowed, with only a few projecting wrinkles at its lower portion; the cervix will be found nearly on a level with the superior strait, softer and larger than previously; ballottement is now readily effected; at the *seventh* month the fundus will be found three fingers' breadth above the umbilicus, with increased abdominal and umbilical projection, and often pain in the groins, from distension of the muscles of the abdomen; the neck is still farther softened, more voluminous, and more difficult to distinguish; at the *eighth* month the fundus extends into the epigastric region, the abdomen is farther distended, and the skin frequently cracks and presents livid marks or lines; the ramollissement, or softening of the cervix is still farther advanced; during the

ninth month, the fundus still continues to ascend, but in the last fortnight of gestation, there is an evident depression of the abdominal projection, the fundus is on a lower level than before; the respiration becomes more free, the woman more lively, and expresses herself as feeling lighter; the cervix is entirely softened. This sensation of sinking of the womb, is, probably owing to descent of the fetus, the head of which can usually, at this period, be readily felt, presenting a voluminous tumor within the pelvic excavation.

Although the above is the average of a number of observations, yet they are not invariable; as, in many females, the shape and capacity of the pelvis and abdomen, and the resistance of the abdominal parietes, will affect, more or less, the rapidity and extension of these changes.

The *direction* of the uterus is altered by the changes which take place in the organ during pregnancy; while it remains within the excavation where it is supported by the pelvic bones, it holds its vertical direction, but as it passes upward into the cavity of the abdomen, where the soft parts alone sustain it, it inclines forward, following the direction of the axis of the superior strait, and which may be owing to the unyielding resistance of the lumbar prominence, and the yielding of the anterior abdominal wall; from the same cause it is made to lean toward one side of the abdomen, most commonly the right, forming the right lateral obliquity of the uterus. The reason of the greater frequency of this right obliquity, is, according to Mad. Boivin, that the round ligament of the right side is shorter, stronger, and more abundantly supplied with muscular fibers than the left; and as they draw the uterus toward the right, they necessarily cause this organ to rotate on its axis, carrying its anterior surface somewhat to the right side, and its posterior to the left; both of which changes are important to be understood.

The *thickness of the uterine parietes* has given rise to much contradictory speculation; some writers concluding, that in consequence of the great distension of the uterus, its walls become very much attenuated, while others consider that they become very much thicker during pregnancy; but the fact is, that at the period of parturition, if an examination of the uterine parietes be made, they will be found to vary according to the portion examined, the neck being very thin, and the body and fundus of the same thickness as when in the non-gravid condition, with the exception of the part corresponding to the insertion of the placenta, which is thicker than at any other place. As there is, then, no diminution of the uterine walls during gestation,

there must necessarily be a great augmentation of their bulk, which is ascertained to be the case, as at term, the uterus has been found to weigh two pounds; and in one instance, cited by M. Moreau, it reached nearly four pounds. In a few rare instances, the parietes of this organ have been found to be only a few lines in thickness.

The *density of the uterine parietes* likewise changes during gestation. In the non-gravid condition they are hard, resisting, and of a consistency approximating fibrous tissue, but in pregnancy they become softer and relaxed, which condition is present even at the first month, the walls, having a softness which gives a sensation on pressure, similar to that of an œdematous limb, or of caoutchouc softened by boiling in water, and which is of some value in determining pregnancy. As the parturient period approaches, this ramollissement and yielding character of the walls continue to increase, so that the inequalities of the fetus may be felt through them, and its motions may not only be distinctly perceived, but will often produce a momentary projection of some part of the organ, and even of the abdominal parietes. In consequence of this suppleness of the uterine fibers, the fetus can change its position within the cavity of the organ during gestation, and thus cause its diameters to vary according to the position assumed, shortening its normal long diameter, and lengthening its short ones. The fetus is also protected from the evil results of blows upon the abdomen, or severe shocks received by the mother, which would ensue were the walls more dense and unyielding.

VITAL CHANGES IN THE UTERINE TISSUES. The most remarkable changes of the uterus, during pregnancy, are those effected in its texture, especially that of its *proper tissue*, or *middle coat*. This tissue, which, as I have heretofore remarked, is of a grayish color, dense, and composed in the non-gravid womb of minute spindle-shaped fiber-cells, with elongated oval nuclei, and which on account of the great quantity of nucleated embryonic connective tissue, can be isolated only with great difficulty; during pregnancy these muscular fiber cells become enlarged, their length being increased from seven to eleven times, and their width from two to five times, while at the same time new ones are formed. The uterus, in pregnancy, changes, therefore, from a state of density to one of softness and elasticity, extending its substance, enlarging, gradually assuming a reddish hue, having its fibers gradually unfolded, elongated, and presenting unequivocal evidence of its muscular nature.

Although the muscular character of the middle uterine coat has

been determined, yet the arrangement of its fibers is still involved in uncertainty. Mad. Boivin, who has minutely examined the uterine structure, has probably given us the most correct account of the disposition of some of these fibers; still, there is much left to ascertain on this point. She states, that there is an exterior plane of fibers, running or radiating from the middle line, outward and downward, to the lower third of the womb; upon this part they terminate, and aid in forming the round ligaments located there, while the most superior ones are distributed to the Fallopian tubes and the ovarian ligaments. There is also an internal plane of fibers, the arrangement of which varies considerably from the external, in being circular, and located at the uterine superior angle; having the internal orifice of the tubes as their center, they surround each of them, describing concentric circles, being very small and close toward the focus, but gradually separating as they advance from this point, so that the last and largest are found upon the median line, and extend in the direction of its length. Other muscular fibers are found between these two planes, but they can not be traced. At the inferior part of the organ is a semicircular order of fibers, which commence at the median line of this region, and reunite on the sides near the round ligaments.

"This structure of the uterus resembles that of all hollow organs, having longitudinal fibers externally, and circular and horizontal ones internally. The greatest development of muscular structure is found in the fundus, which is part of the organ more especially concerned in the expulsion of its contents, and this structure is so disposed that, during contraction, the uterine surface approaches toward the center. The least resistance, during labor, should be made at the inferior part of the uterus, in which we find merely the horizontal fibers, forming an arrangement which will bear some comparison to a sphincter muscle."

Other anatomists have attempted to trace the uterine muscular fibers, and have separated them into layers, planes, and fasciculi; yet, notwithstanding all these attempts, there is so much irregularity and confusion in the course and arrangement of these fibers, so many crossings and intercrossings, and such an interweaving of them, that it is impossible to demonstrate them satisfactorily; we have presented to us only an inextricable muscular network, rendering the uterus fully capable of performing all its various movements of extension, contraction, dilatation, and shortening. M. Moreau observes that "a skillful dissector may give the fibers any direction he chooses, without the possibility of proving the contrary." Farre observes, "Nothing like

a continuous arrangement of muscular fibers in the form of circular or longitudinal bands, surrounding or investing the organ can anywhere be demonstrated by the aid of the microscope."

That the longitudinal and horizontal fibers are separate and independent parts of the uterine structure, and probably all the other fibrous arrangements, may be inferred from the fact, that we often have one set of them powerfully acting, while, at the same time, the other is contracting with but slight force, or even not at all. Thus, in the hour-glass contraction, we have an example of forcible contraction, and a want of it at the two antipodal extremities. Again, not unfrequently there appears to be a want of action of those fibers which contract the organ in its longitudinal diameter, elongating the uterus to such an extent, that, as ascertained by an examination through the relaxed abdominal walls, after delivery, its length will be ten or eleven inches, with the fundus elevated toward the epigastrium, while its transverse diameter will be only three or four inches, resembling an intestine, rather than the womb.

A female during labor, as is often the case, may suffer intense pains, and make the most vigorous efforts, without any advance, whatever, of the child, although the pelvic formation is normal, and the uterus sufficiently dilated; may this not be owing to a want of simultaneous action of the two separate sets of fibers, the horizontal being active, while the longitudinal are slightly so, or altogether inert? This want of synchronism in the movements of the fibers, may be owing to irritation occasioned by protracted or severe labor, by rheumatism, by the administration of ergot, or by officious intermeddlings, and which may also result from extreme susceptibility of the nervous system. Gelsemium will be the remedy if the irritation has developed spasmodic action; or Lobelia, by relaxation, may overcome the irregular action in the two sets of muscular fibers. If the condition depends upon rheumatism, think of Macrotys. In either case, to relieve this painful condition, the internal use of Opium, Morphia, or Diaphoretic powder, may be given as often as the urgency of the symptoms indicate; the room must be freely ventilated, the drinks should be cool, and no examinations per vaginam must be instituted until the contractions become normal, and not then, without they are actually necessary. Occasionally, under these circumstances, and where there have been no previous violent contractions, in addition to the above treatment, I have found firm, but moderate, pressure over the fundus to restore the energy of the inactive fibers.

The *serous*, or *external peritoneal coat* of the uterus, during pregnancy, extends in every direction, with a more active nutrition that

prevents any diminution of its depth, there being but little difference in the thickness of this external covering, either in the gravid or non-gravid womb. The serous covering is movable on the tissue which unites it to the middle or muscular coat, this tissue being apparently diminished in density.

The *internal*, or *mucous coat* of the uterus, about which there have been so many discordant opinions, becomes very evident during pregnancy; it is softer, more lax, and redder, is more distinctly defined from the muscular coat, its vessels become more distended; and becoming hypertrophied, it presents an increased and villous appearance, and from its great development its nutrition undoubtedly becomes more active. Its follicles become more marked, with an increase of their secretion. There are also glands found imbedded in the thickness of this coat, which appear to enter into the internal muscular layers; these enlarge after conception, and are viewed by some authors as the principal elements of the caducous or nidal membrane. These glands resemble small canals, and run tortuously within and behind the mucous uterine coat, forming a kind of knot, throwing out ramifications, and opening on the internal face of the inner mucous layer: they have been called the utricular glands.

The *blood-vessels* of the uterus likewise undergo changes which may be briefly noticed. In the unimpregnated condition the arteries are small, flexuous, and very much contracted, but during gestation, as they become less compressed by the uterine fibers, they expand, soften, and describe more regular curves; their caliber increases, the blood circulates more largely and rapidly, and a more active and energetic nutrition ensues. The arteries of the uterus, as heretofore stated, are furnished by the spermatics and hypogastrics, the superior portion of the uterus receiving chiefly the branches from the spermatics, and the body and cervix those only from the hypogastrics. The arteries are always tortuous, and when they arrive at the uterus, they do not run any distance under the peritoneum, but immediately enter into the muscular coat, pass toward the inner surface, and especially to the part where the placenta is attached, ramifying and anastomosing freely as they proceed; those branches which reach the lining membrane terminate in the tortuous canals in the placental decidua, while those which do not arrive at the inner surface ramify upon the coats of the veins. The veins of the uterus are greatly dilated, much more so than the arteries, and their points of communication with each other are multiplied to that degree, that at the parturient term, an inextricable mass of venous vessels is presented, giving to the uterine tissue a resemblance to that of the erectile. That part of the uterus to which

the placenta is attached is more abundantly supplied with veins; and on removing the placenta, the veins which open into the uterine cavity will be seen, presenting large, smooth-edged and oblique apertures. There are no proper valves to the veins, so that if any fluid be injected into the trunks of the spermatic and hypogastric veins, it will flow in a full stream into the cavity of the uterus, which may afford some explanation of the cause of the large quantity of blood discharged in so short a time from the uterus during parturition, together with that from the exposed arteries. The venous circulation in the uterus and placenta may be readily interrupted by the various derangements of function in the thoracic and abdominal viscera, and the removal of these obstructions during pregnancy is an important point.

The lymphatic vessels, or absorbents, likewise, become greatly enlarged during pregnancy: according to Cruikshank, the first who observed them, they are as large as a goosequill, and are so numerous, that when injected with mercury, they give to the uterus the appearance of a mass of lymphatic vessels. Those of the neck run into the pelvic ganglia, and those of the body into the lumbar ganglia. Cruikshank supposed their function to be that of carrying on a "copious absorption in the uterus toward the mother," during pregnancy; but Dr. Robert Lee has suggested another very probable function; he observes, "The sudden removal of the uterine structures after delivery by absorption, is probably the most important office they perform, and the cause of their enlargement to such a vast size during the latter months of pregnancy."

The *nerves* of the uterus likewise become considerably developed during gestation, for the undoubted purpose of furnishing the uterus, during the parturient act, with all the nervous energy that may be necessary. After delivery, the nerves, together with all the augmented tissues and vessels of the uterus, return to their original size and condition.

CHANGES IN THE PROPERTIES OF THE UTERUS. In the unimpregnated condition, the vital properties of the uterus are very obscure, so that it may be touched, compressed, pricked, or even cauterized without causing pain or much uneasiness, unless it be morbidly affected; at this time its properties are chiefly limited to its tonic forces, or organic sensibility and insensible contractility, the separation of the principles of growth and nutrition from the circulating fluids, and the elimination of de-vitalized or decomposed elements which are no longer necessary to the maintenance of life.

It is true, that when the finger is brought into contact with the neck, the female is conscious of the touch ; however, the sensation goes no farther ; but during pregnancy the *animal sensibility* becomes much more marked, and the female more readily recognizes the contact of bodies with the neck, as well as the fetal movements, and which sensibility becomes more developed as gestation advances, so that in its latter stages even the touch becomes excessively painful with many women, and during parturition the uterine contractions produce intense agony. The introduction of the hand within the uterus, for the purpose of turning, effects similar pain, and when the adhering placenta is removed artificially, the woman experiences sensations as if she were being eviscerated. This exaltation of animal sensibility is principally confined to the neck, the body of the organ being nearly insensible ; there exists, however, a relation between these two parts, from which irritation of the neck will influence the fibers of the body. And this relation will account for the premature births effected by repeated touchings, frequent coition, the irritations of the cervix from artificial dilatation, or the use of agents which stimulate the cerebro-spinal system. It occasionally happens, that the female will be unconscious of any movements of the fetus until the latter months of gestation, or even not until labor actually commences, owing to the slight development of sensibility, but in the majority of cases it is the very reverse of this.

The most remarkable property, however, which the uterus manifests during pregnancy is its *organic contractility*, which either did not previously exist, or if it did, it remained latent. This property, precisely resembles the contraction of a muscle, and is never manifested except under some irritating or stimulating influence ; it varies in intensity in different females, and is so marked and energetic in many instances as to benumb the hand of the strongest man, when introduced to perform artificial delivery. It is this contractile power which effects the expulsion of the fetus and its secundines, as well as other productions which may be accidentally developed within the uterine cavity, and which, likewise, causes the womb, as well as its various vessels, to gradually return to the diminished condition in which they were previous to conception. Should the organic contractility of the uterus, from any cause, fail to manifest itself after parturition, a hemorrhage would ensue that would prove rapidly fatal to the parturient woman ; and, when such cases occur in practice, the most important indication is to arouse this power of contraction, which is the natural remedy, and which produces its beneficial results by closing and obliterating

the large open mouths of the blood-vessels on the internal placental surface of the organ.

In the human family the presence of these contractions is always accompanied with more or less pain, which is never found among animals in a state of nature, and which exists among savages and domesticated animals in only a minor degree. Accident or disease may, however, be the cause of pain with these last when in labor; and we have good reasons for believing that the excessive pains undergone by parturient females of our own race, are the results of the enervating influence of civilization and its various customs, habits, and refinements upon the constitution. In 1842, I was called upon to attend Mrs. D——, about twenty years of age, a short, thick-set female, brunette, and in apparent good health, with her first child; there had been observed a discharge of the waters, "the show," together with some singular and indescribable feelings, but no pain. From these symptoms, together with the calculations made upon the matter, it was presumed that labor could not be far distant; and it was, likewise, deemed expedient by the mother that the advice of a physician should be resorted to. Having ascertained that no pains of any kind had been experienced, I thought myself unwarranted in making any examination, but did so at the urgent request of the mother, when to my great astonishment I found the head within the pelvic cavity, and upon placing my hand upon the abdomen, I felt very distinctly the contractions of the uterus as they occurred, but the patient complained of no pain whatever. I now seated myself by the bedside to watch the progress of labor, as well as to be ready for any emergency in so singular a case, and the whole process of parturition was effected without any untoward accident, and without the least pain, if the asseverations of the female are to be believed; during the latter stage she evidently contracted the abdominal muscles and made bearing down efforts, not, she stated, from any painful influences, but from a strong sensation or desire to make them. Shortly previous to my visiting the West, I again attended this lady in her second labor, when she suffered as severe pains as I remember to have ever witnessed in the parturient chamber. The cause of this anomaly I do not pretend to understand. The female, as a rule, suffers more severely with the pains in her first labor, than in subsequent ones; however, there is no law governing this matter so far as individuals are concerned: each accouchment of the same woman is peculiar unto itself. In prognosing the probable outcome of a labor, the practitioner should not be influenced by for-

mer experiences with the same person. As in the case cited, the condition of the woman may be so favorable, that delivery will be accomplished and she scarcely experience any uneasiness whatever, and but very slightly the pains peculiar to labor, while her next lying-in may be characterized by the most severe pains, and suffering so intense as to demand relief by the administration of remedies, in some cases necessitating the effect of an anæsthetic.

The exercise of these organic contractions ensues involuntarily and without any dependence on the will, yet we sometimes find them influenced by mental impressions, so much so, that a violent emotion may arouse them at a premature period, and it is not an uncommon circumstance for the appearance of the accoucheur in the room of the lying-in woman to cause a suspension of them for several hours, or even days. They may likewise be suspended for some hours by the administration of opiates, as well as excited by stimulants, or irritation applied to the neck, or, ergot, strychnia, electricity, borax, and many other agents internally administered. If the uterus is excessively distended—if the labor has been too rapid, or prolonged—the contractions are very apt to diminish—become more slow and feeble, or entirely cease. I have met with instances, in which the contractions have been suspended for several hours, in consequence of an intoxicating draught of hot gin or brandy sling having been given by the nurse, to “case the pains and give the woman strength.”

These changes in the condition of the uterus, necessarily effect some modifications of the neighboring parts. In the early period of pregnancy, as the uterus enlarges in the cavity, the vagina becomes shortened, but as soon as the former rises above the superior strait, the latter becomes narrower and longer; in its elevation the uterus carries its surrounding peritoneum along with it, the folds of which, or the broad ligaments, disappear, and the tubes and ovaries approach nearer to the uterus, where they rest, nearly in a perpendicular position; the round ligaments present short linear fibers, among which are prolongations of the muscular fibers of the uterus, and which contract with that organ.

From the increased vitality of the re-productive organs, as well as from the obstruction of circulation by the enlarged uterus, the veins of the vaginal walls become more developed, with various appearances, which are often recognized, toward the termination of gestation, by the finger. The *vaginal pulse*, of Oslander, which he estimated highly as a diagnostic sign of pregnancy, may be felt, at some portion of the

vagina, and is owing to the excessive enlargement of the vaginal and uterine arteries. About the seventh or eighth month, the vaginal mucous membrane is frequently covered with granulations the size of a pin's head, which not only line the whole extent of this canal, but also the exterior surface of the neck, and even the interior. When these are present, there is an increased vaginal secretion.

One of the important changes to be understood by the practitioner, is that undergone by the bladder. This organ is gradually pressed above the superior strait, the urethral canal is elongated, and its orifice will be found behind the edge of the pubic symphysis, so that in introducing a catheter it must be directed nearly if not quite parallel with the pubic bone, with its concavity in front, and, in some instances, the curve of the canal becomes so great, from the bladder being pressed forward and above the pubis, that a male catheter will be introduced with more facility. This compression on the upper part of the canal, impedes the circulation in the lower parts, from which results tumefaction of its whole length. Tenesmus of the bladder is often the consequence of compression on the body and neck of this organ, occasioning frequent, urgent, and ineffectual efforts to urinate. In not a few instances the catheter will have to be used to relieve the irritated and distended bladder.

CHAPTER XVIII.

OF PREGNANCY.

WHEN the fecundated ovum becomes attached to some portion of the uterus, conception is said to have taken place, and the peculiar condition of the woman, from the moment of conception to the period of parturition, is called *pregnancy* or *utero-gestation*; this usually comprises nine calendar months, or two hundred and eighty days from the last menstrual show, or one hundred and forty days after quickening—the time at which most females perceive the first motions of the fetus, and which generally occurs about the twentieth week after conception. Although this is the period which seems to have been generally recognized from the earliest ages, yet it is not invariable, as it occasionally terminates sooner, and again, may extend to even ten months, of which there are well attested cases on record. The determination of this subject is one of great difficulty, as we can seldom ascertain the precise moment of fecundation, and yet it is one of immense importance, from the fact that the legitimacy of the offspring may depend upon a correct decision.

The only method by which we can ascertain the commencement of utero-gestation, is by reference to the period of the last menstrual flow, as well as to the time of quickening; but even these means are very uncertain, as conception may occur sometime during the intermenstrual period; beside which, the period of quickening varies in different women. On account of these difficulties, laws have been established in several nations, fixing the term within which legitimacy is acknowledged by them; thus, in France, the “Code Napoleon,” admits the legitimacy of a child born within three hundred days after wedlock, divorce, or death of the husband; and if born after that time, its legitimacy may be contested, though it is not to be viewed as a bastard. In Prussia, three weeks beyond the usual time are allowed, or three hundred and one days. In Scotland, ten calendar

months are considered the extent of legitimacy. In England and in this country, the limit of gestation is not determined by law.

That the term of utero-gestation varies in many females is, I believe, generally admitted by observing accoucheurs of the present day, and the existence of the laws on this subject, in the countries above referred to, are strong confirmations of the possibility of protracted gestation. Indeed, I have met with several instances in which I had every reason for believing that the pregnancy had been prolonged to two and three weeks beyond the usual period; and two, in particular, in which I positively know that gestation was continued for ten months. Drs. Blundell, Desormeaux, Hunter, Montgomery, Rigby, Hamilton, Burns, Dewees, Velpeau, Merriman, Moreau, Simpson, Meigs, Atlee, and many others, have met with similar instances, in which the term of gestation had extended from one to four weeks beyond nine calendar months. Their reported cases, taken in connection with investigations made on animals, as rabbits, sheep, cows, mares, etc., that likewise are found to vary considerably in their periods of gestation, certainly afford the strongest evidence in favor of prolonged pregnancy. Relative to this subject, Dr. Montgomery justly observes: "We can not imagine why gestation should be the only process connected with reproduction, for which a total exemption from any variation in its period should be claimed. The periods of menstruation are, in general, very regular; but who is there who does not know, that as there are, on the one hand, women in whom the return of that discharge is anticipated by several days, so there are also many in whom the return is postponed an equal length of time, without the slightest appreciable derangement of the health. Again, menstruation and the power of reproduction in the female, very generally, indeed almost universally, ceases about the forty-fifth year, in these countries; yet occasionally instances are met with, in which both are prolonged ten or fifteen years beyond that time of life; and a similar variety is observable, in the period of the first establishment of that function in the system. If we turn our attention to brutes, the conditions of whose gestation so closely coincide with those of the human female, and are less disposed to have it disturbed, we can not for a moment doubt the fact, that there is a great irregularity in the term of gestation in different individuals of the same species."

Dr. Charles Clay, of England, has advanced the view that the term of utero-gestation is regulated by the ages of the individuals concerned in the act; that the younger these individuals the shorter the term, and, as

age advances, the period of gestation is proportionately lengthened. From what he has been enabled to glean, the term of gestation has occurred as follows :

At 12½	years of age.....	264 days.	At 25 years of age.....	274 days.
" 15	" "	..... 267 "	" 30	" " 276 "
" 15 to 15½	" "	..... 267 "	" 35	" " 278 "
" 15 to 17	" "	..... 270 "	" 44	" " 284 "
" 19	" "	..... 272 "	" 52	" " 290 "

But, he observes, the age must be calculated not by that of the mother alone, but by the combined ages of both parents. Thus, if the female be twenty, and the male thirty, a result must be expected equal to an age of twenty-five, or, taking into consideration the earlier maturity of the female, of twenty-four. If, however, the female be thirty, and the male twenty, then the result would equal an age of twenty-six. For the extension of inquiry on this subject, he remarks: "It will be desirable in all cases to be recorded, whether in favor or against the propositions here laid down, to secure the following data: 1st. Date of conception arising from a single contact. 2d. Date of parturition commencing. 3d. Age of the mother. 4th. Age of the father. 5th. In statements of age, where the female is the younger, it must be fixed at the year *below* the mean ages of the two combined. 6th. Where the female is the older, the age must be fixed a year *above* the mean of the two combined; by this rule the average age on the [above] table will give the days of gestation more correctly than by any other known rule." (*The Complete Handbook of Obstetrics, Surgery, etc.*, by Charles Clay, M. D.) This hypothesis of Dr. Clay's does really appear to be supported by the data he advances, and is certainly deserving more thorough investigation.

I will give here a table which will be found useful for determining the period at which menstruation, quickening, parturition, etc., may probably occur. This table is so arranged that the dates on the same line in the several columns are consecutively twenty-eight days or one lunar month distant from each other. Thus, if a female menstruates on the 7th January, her next period will occur twenty-eight days subsequently, on the 4th February, the next on the 4th March, then 1st April, and so on.

Pregnancy is usually dated from the last menstruation, on account of the difficulty of determining the precise period of a fruitful coitus;

TABLE for determining the Time at which Menstruation, Quickening, Parturition, etc., may be expected to take place.

Jan. 1	Jan. 29	Feb. 26	Mar. 26	Apr. 23	May 21	June 18	July 16	Aug. 13	Sept. 10	Oct. 8	Nov. 5	Dec. 3	Dec 31 to Jan 28
2	30	27	27	24	22	19	17	14	11	9	6	4	Jan. 1
3	31	28	28	25	23	20	18	15	12	10	7	5	2
4	1	1	29	26	24	21	19	16	13	11	8	6	3
5	2	2	30	27	25	22	20	17	14	12	9	7	4
6	3	3	31	28	26	23	21	18	15	13	10	8	5
7	4	4	April 1	29	27	24	22	19	16	14	11	9	6
8	5	5	2	30	28	25	23	20	17	15	12	10	7
9	6	6	3	May 1	29	26	24	21	18	16	13	11	8
10	7	7	4	2	30	27	25	22	19	17	14	12	9
11	8	8	5	3	31	28	26	23	20	18	15	13	10
12	9	9	6	4	June 1	29	27	24	21	19	16	14	11
13	10	10	7	5	2	30	28	25	22	20	17	15	12
14	11	11	8	6	3	July 1	29	26	23	21	18	16	13
15	12	12	9	7	4	2	30	27	24	22	19	17	14
16	13	13	10	8	5	3	31	28	25	23	20	18	15
17	14	14	11	9	6	4	Aug. 1	29	26	24	21	19	16
18	15	15	12	10	7	5	2	30	27	25	22	20	17
19	16	16	13	11	8	6	3	31	28	26	23	21	18
20	17	17	14	12	9	7	4	Sept. 1	29	27	24	22	19
21	18	18	15	13	10	8	5	2	30	28	25	23	20
22	19	19	16	14	11	9	6	3	Oct. 1	29	26	24	21
23	20	20	17	15	12	10	7	4	2	30	27	25	22
24	21	21	18	16	13	11	8	5	3	31	28	26	23
25	22	22	19	17	14	12	9	6	4	Nov. 1	29	27	24
26	23	23	20	18	15	13	10	7	5	2	30	28	25
27	24	24	21	19	16	14	11	8	6	3	Dec. 1	29	26
28	25	25	22	20	17	15	12	9	7	4	2	30	27
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
28 days.	56 days.	84 days.	112 days.	140 days.	168 days.	196 days.	224 days.	252 days.	280 days.	308 days.	336 days.	364 days.	392 days.

two hundred and eighty days after the last menstruation is the usual period allowed for full term of pregnancy; or two hundred and seventy-five days from a fruitful coitus when this is known. Hence, five days may be allowed in the calculation with the accompanying table; thus, if a pregnant female had her last menstruation on 29th July of any year, her period of confinement will occur at about two hundred and eighty days, or ten lunar months subsequently, which, upon counting, we find will be on the 8th April of the ensuing year; or by allowing five days, we may expect her labor to come on between the 8th and 13th of April.

Quickening is generally supposed to be first experienced at about the one hundred and fortieth day of pregnancy; hence, if a female perceives quickening for the first time on 11th August, by counting along in the table for the balance of the period of pregnancy, that is, one hundred and forty days, or five lunar months, we find that labor will probably occur upon or about the ensuing 29th December. I say, probably, because there is less certainty in this, as quickening may be perceived at a much earlier period, or, at a more advanced stage of the pregnancy.

After December, the present year in question terminates, so that, upon finding on what day in January, in the last or fourteenth column, the counting along on the same line terminates, and it is necessary to count on still farther, we must return to the same date of January in the first column, as we left in the last or fourteenth column, and then count along on the corresponding line as far as may be required. Thus, if we desire to count nine lunar months from 18th October, we find that three lunar months brings us to 10th January of the next year in the last or fourteenth column—we now find the 10th January in the first column, and by counting along for the balance of the time, six lunar months, it brings us to the 27th June of the subsequent year.

In *leap year* one day may be deducted from the ascertained period, after having passed the month of February of the leap year; thus, two hundred and eighty days from 19th November would be 26th August of the ensuing year—but, if this be a leap year, it will be 25th August; again, two hundred and eighty days from 13th August would be 20th May of the next year, or, if leap year, 19th May.

By reference to the figures at the bottom of each column, counting from the first column, we can always determine how many lunar months or columns must be included within any number of days, and *vice versa*. Thus, six lunar months or columns are equal to one hundred and sixty-eight days—then one hundred and sixty-eight days

from the 18th July would be six columns or lunar months, carrying us to 2nd January of the next year. The reader may find various other uses for this table.

Another point to determine, is the earliest period at which a child may be born, consistent with its existence subsequently. This is likewise a subject of much moment, involving the reputation of a mother, the legitimacy of offspring, and the peace and happiness of families, especially in those instances where the fetal developments exceed those which are generally found at the various periods of pregnancy. I remember an incident which occurred some years since, and which I will relate here, to show the importance of prudence. I was called to attend a lady who had aborted three months after her marriage: the fetus presented all the appearances of one between the fourth and fifth months, and on seeing it, I innocently remarked, "it is a good-sized one." This imprudent remark occasioned much unhappiness in the minds of the husband, the mother of the lady, and herself; and they each inquired of me, in private, if I supposed there "was anything wrong?"—having reference to the wife's chastity. I had long known each of the parties, before their marriage, and had no reasons whatever for the most distant idea of want of purity and virtue, and it was from this consciousness of undoubted integrity of character that the observation was inadvertently made—and I so replied to their inquiries. About eighteen or nineteen months afterward, I delivered this lady of a male child, at full term, which having been weighed on the day of its birth, was found to exceed twelve pounds. Here was an extraordinary development of size at full term, and a similar excess of growth was undoubtedly the case with the previously aborted fetus.

The seventh month is generally viewed as the shortest period in which a viable child may be born, yet there are many instances in which it has occurred still earlier. These cases, do not however militate against the general view regarding viability, and should be considered exceptional, exerting no influence as to the justifiability of inducing premature labor at the seventh month, in the hope of preserving the life of the child. Dr. Dewees states, that he has known instances of this kind: one "in which labor habitually occurred at the seventh month, and two, in which it regularly took place at the eighth month of pregnancy." In Scotland, a child born six months after marriage, or after the death of the father, is considered legitimate. Carpenter, in his *Physiology*, mentions an instance in which a child, born twenty-five weeks after wedlock, lived between six and seven

months, and was declared to be legitimate by the Presbytery of Scotland. Dr. Dodd and Dr. Christian relate similar cases, as well as many other physicians. Dr. W. Hunter observes, that "a child may be born alive, at any time after three months; but we see none with powers of living to manhood, or of being reared, before seven calendar months, or near that time. At six months it can not be." Beside the many recorded cases where children, born previous to the seventh month, lived for an hour to several days or weeks thereafter, it may be interesting to refer to the following: M. Capuron mentions the case of Fortunio Liceti, who, born after a gestation of four months and a half, lived subsequently for eighty years. M. Devergie relates the case of Cardinal Richelieu, who was born at the fifth month. Dr. Hamilton cites a case where a child born only nineteen weeks after conception lived eighteen months. Dr. Lavirotte, in *Lyon Médical*, April, 1873, observes that viability does not solely depend upon the intra-uterine age of a fetus, but likewise upon its volume, its weight, its muscular force, the more or less advanced organization of its skin and nails, and especially upon respiration, digestion, nutrition, and normal condition of the heart and large blood-vessels. The fact that a child, born at the seventh month of gestation, may subsequently continue to live, is of importance in another point, viz.: the induction of premature labor.

Upon these various deviations from the most common course of pregnancy, it is not my intention to offer any speculative views, as the present work is intended to be, not one of theorizing, but of utility in a practical point, to those who consult its pages; I will, therefore, leave this subject, by observing, that an opinion in these cases should always be given very guardedly and reservedly, lest by a hasty and improper decision we tarnish the reputation, and consequent happiness of the innocent.

It sometimes happens that the ovum, after impregnation does not reach the cavity of the uterus, but becomes attached to the interior walls of the Fallopian tubes, abdomen, etc., in consequence of which, from want of a proper and natural connection with the mother, the development of the ovum is much retarded, is seldom perfected and disease often attacks it; under these circumstances, a well-formed living fetus could not be produced. I am aware, that some writers object to these facts as being without foundation; but the objections are commonly presented by those who support the theory that the male semen never extends beyond the uterine cavity, within which, alone, fecundation occurs. As before stated, the spermatic fluid has been

found in the tubes, and on the ovaries of various animals by rigid investigators; beside, the fact that fetal formations, without the uterus, do occasionally exist, is, in connection with the above, an evidence tending, to say the least of it, to support a belief of the possibility, as well as the probability, of fecundation occurring beyond the uterine cavity.

When the impregnated ovum reaches the uterus, and is developed within its cavity, it is termed a *normal* or *uterine* pregnancy, which is divided into *simple uterine pregnancy*, when there is but one fetus; *compound* or *multiple pregnancy*, when there are more than one; and *mixed*, *complex*, or *complicated pregnancy*, when, with the existence of the fetus, there is also, a mole, hydatids, or some morbid condition of the uterus, or its appendages. When, instead of passing into the uterus, the vivified ovulum becomes fixed upon the tubes, abdomen, etc., it is called *extra-uterine pregnancy*, of which there are several varieties, according to the place of adhesion of the ovum, and which I will refer to in the ensuing chapter. To those pathological conditions which simulate pregnancy, often misleading both the patient and her physicians, and which occur independently of true conception, the term *false pregnancy* has been improperly applied.

CHAPTER XIX.

COMPOUND AND MIXED PREGNANCY.

COMPOUND or multiple pregnancy, are the terms applied to those pregnancies in which more than one fetus exists within the uterus at the same time. The cause of this peculiar disposition which some women have to compound pregnancies, is a matter of mere conjecture, and but little is known relative to it which is either satisfactory or worthy of confidence. It has been attributed to the impregnation of two or more Graafian vesicles during a fruitful embrace, and which may happen either in one or both ovaries; again, and with some degree of probability, it is stated that one vesicle may contain two or more ovules, each of which becomes fecundated upon the rupture of the vesicle during copulation. By some physiologists it has been supposed that this anomaly is not the result of one act of impregnation but of two or more, and this is undoubtedly true in many instances, as examples

are on record of females having given birth to twins, one being white and the other colored, the result of intercourse successively with a white man and a negro. And previous to the secretion of the mucus which fills the canal of the cervix during gestation, or to the appearance of the membrana decidua, superfetation may be possible.

Cases of a marvelous and probably fabulous character, are recorded where women have given birth to five, six, or even nine children at one birth, but it is rarely the case that more than two are present during pregnancy. In the course of a practice of thirty-one years, I have met with but three cases of triplets, and one in which a woman had four children at one birth, all closely resembling each other; while of twins or couplets I have met with quite a number, averaging about one in every eighty labors. From the want of sufficient vital force bestowed upon them, triplets seldom attain adult age, and twins rarely attain the meridian period of manhood.

As a general thing, in compound pregnancies, each fetus or embryo is surrounded by its own proper membranes, the chorion and amnion, so that the children do not come in contact with each other; but have between them four layers or laminæ, the two amnios, and the two chorions which touch each other. Sometimes, one chorion incloses both ovules, each, however, being enveloped with its proper amnion, and in which case there are but two layers or laminæ separating them, the two amnios which rest against each other. Occasionally, the fetuses are all inclosed in one amniotic cavity; and very rarely, one fetus is contained within the body of another.

In the first-mentioned variety, should the placentas be united, there will be no vascular communication between them; and should one child die while within the uterus, it will not necessarily involve the life of the other; this will frequently be found to occur in twin and triple pregnancies. The same labor may expel both children, or, if permitted, one child may be born two or three days earlier than its brother.

In the second variety, the chorion being common to each, there will be two cords and but one placenta, and as in the first, one fetus may continue to live independent of the death of the other. In this variety the birth of the two children must take place during one labor, the one being immediately expelled after the other.

In the third variety, one placenta will be common to each, with two cords, which sometimes extend to the placenta, and at others bifurcate from one common trunk at various distances from the placenta. In these cases, we often meet with monstrosities or imperfectly-formed

children. The birth of the children must take place in this as in the second variety, during one labor; and possibly, the death of one may endanger the life of the other.

In the last form, monstrosity is frequently the result. One fetus may be inclosed in the abdominal cavity of the other, which is termed *profound* or *abdominal inclusion*; or, it may be merely surrounded by the integuments of the other, forming an external tumor having no communication with its internal cavities, which is termed the *cutaneous* or *exterior inclusion*.

There are no positive signs by which we can indicate the existence of twin pregnancy, although some have been noticed by writers. Thus, an unusual development of the uterus—but this may be owing to an increase of the liquor amnii; a flattening or longitudinal depression of the abdomen on the median line, in connection with the above, might justly give rise to a suspicion of twins, but this could only happen when the fetuses lie one upon each side of the uterus; two distinct shocks or motions, are sometimes felt at the same time in different parts of the uterus, but no reliance can be placed upon this as a sign; again, ballottement is exceedingly difficult in compound pregnancies, as one child must necessarily interfere with the ascent of the other. Auscultation has been named as a mode of detecting twin pregnancies, but we may err even in this, as the sound of the fetal heart can often be distinctly heard in distant parts; Cazeaux says, "Whenever the pulsations are heard at two distant points, the line between these should be carefully sounded with the instrument; for if they are produced by the presence of two fetuses, the pulsations will become feeble, or almost disappear toward the center of this line; but if, on the contrary, they are due to a single child, they will be just as strong at its middle part as at either extremity." The diagnosis is rendered more certain if with these varied pulsations we ascertain them to be non-synchronous in action, and with a different rhythm. However, it is of little importance to determine the presence of more than one fetus within the uterus during gestation, as a knowledge of it could be of no utility whatever, until parturition had taken place, at which time it can readily be detected.

Compound pregnancy, in consequence of the excessive development of the uterus, frequently induces labor previous to full term, and it is not uncommon in these instances to find the uterus contracting and expelling its contents during the seventh and eighth months of utero-gestation.

In addition to the above there are, 1st, *false pregnancies*, improperly so called, in which the uterus contains a false germ, mole, or hydatidiform growths; and 2d, *mixed pregnancies*, where the uterus contains both a fetus and mole.

Moles and hydatoid formations, are undoubtedly the results of some diseased condition of the ovum, by which it becomes destroyed, or metamorphosed, into a growth possessing sufficient vitality to exist and augment in size, until removed by the uterine contractions. It is a true conception at first, but which becomes blighted by disease, and degenerates into morbid development. The vesicular mole is more generally met with, though it is rare to find it perfect, and in the examination of abortive ova, vesicular degeneration of the chorionic tufts will very often be found, and in the membranes of fetuses born at the full time a few stalked vesicles may be seen. (*Fricker.*) Other moles may form from a hypertrophied condition of the membranes, from hemorrhage between the decidual layers, or into the placental cells, etc., and consist of a mass of solid substance. The disease occasioning the vesicular form may commence with the ovum in the ovary; if the solid mole be the result of an abnormal condition of the nidal decidua, it may possibly occur without impregnation, or even copulation, but such cases are extremely rare.

These false pregnancies are extremely difficult to detect. When the uterus increases in size with greater rapidity than is natural under ordinary causes, with nausea, or vomiting, and tendency to fainting, more severe than with normal pregnancy, great constitutional irritability, occasional attacks of uterine hemorrhage, emaciation, quick pulse, absence of the fetal-heart sounds, fetal movements, and ballottement; a want of correspondence between the duration of the pregnancy and the rapid uterine development, occasional discharges of portions of the mole, a presentation at the os uteri of a substance somewhat like that of the placenta, but between which and the inner margin of the uterine cavity the finger glides along without difficulty, etc., we may be led to suspect the presence of hydatidoids; and upon a vaginal examination, if we find a soft mass in the cervix, which upon being roughly pressed, bleeds, and discharges upon the finger portions of aqueous vesicles, our suspicion becomes certainty. Under these circumstances we must endeavor to promote an early expulsion of them. The index finger may be passed within the os uteri sufficiently far to reach the mass and break it in pieces; as soon as the contractions of the uterus have removed the detached pieces, we must examine again to ascertain whether any portion remains, and if any

are found, they must be again broken, and thus proceed till the whole mass is discharged. If the finger can not be readily introduced for the above purpose, a sponge-tent may be placed in the canal of the cervix for the purpose of inducing uterine contractions, or ergot may be administered. Dr. Lawson Tait's compressed carbolized sponge-tent may also be used, or Molesworth's uterine dilator.

The prognosis is not very favorable in molar pregnancy, as the woman is exposed to death from hemorrhage, from the effects of the operative assistance more generally required, and from remote accidents; and, even should recovery ensue, she may suffer for a long time from extreme debility, anemia, etc.

Hemorrhage to an alarming extent often accompanies a labor for the expulsion of hydatidiform growths, for which, in the early months, the tampon may be employed, or the os uteri and vagina may be plugged by means of muslin torn into strips, or a sponge saturated in a mild solution of per-sulphate of iron; together with other means for arresting uterine hemorrhage referred to under the head of Abortion, while at the same time the strength and general condition of the patient must be closely attended to. In cases where the practitioner is thoroughly satisfied that the uterus does not contain a living fetus, the previous symptoms of pregnancy having disappeared, and there is a continued hemorrhage gradually reducing the patient, the safest plan is to dilate the cervix, examine the uterine cavity, and at once remove any form of molar pregnancy contained therein, or any dead fetus; or, if it be a tumor that has occasioned the uterine development, treat it according to the indications.

Mixed pregnancies are likewise very difficult to distinguish, and are almost always a cause of abortion, at which time the practitioner must be watchful of the hemorrhage which may ensue, endeavoring to check it, if possible, that the fetus may be saved; but, in any case, when the hemorrhage is profuse, and does not readily yield to treatment, the safest method will be to cause a speedy discharge of the uterine contents.

When the ovule becomes impregnated within the ovary, it is seized upon by the fimbriated extremity of the Fallopian tube, through the canal of which it passes until it enters the cavity of the uterus, in which it becomes gradually and fully developed. Many writers believe that fecundation takes place only within the uterus, but the existence of extra-uterine pregnancies proves that it may ensue in the ovary itself; and the idea advanced by some that the ovule after impregnation may make a retrograde movement from the uterine cavity through

the tubes to the ovary or abdomen, is both absurd and opposed to reason. Undoubtedly impregnation may take place in the ovary, tubes, or within the uterus, whenever the male semen comes in contact with the matured ovum at any of its various points of discharge. However, let it occur where it may, it is occasionally found that the ovum does not reach the uterine cavity, but is arrested or diverted from its route, and attaches itself upon some unnatural point, from which it proceeds toward a partial development; these instances are termed *abnormal*, or *extra-uterine pregnancies*.

The causes of extra-uterine pregnancy are involved in much obscurity; in some instances there have been found partial or complete obliteration of the canal of the tubes, either at some particular point, or throughout their whole extent, but the occasion of these closures or their period of occurrence, is not satisfactorily explained. Blows upon the hypogastrium soon after conception, have been named among the causes, though there is no certainty in relation to the subject, which is still one of inquiry. Cases are recorded in which fecundation took place, although the tubal canals were imperforate throughout, and many others where it has occurred, without a rupture of the hymen, so that notwithstanding what has been advanced in relation to the matter of impregnation, much yet remains for investigation.

In the early period of extra-uterine pregnancy, its determination is very difficult, if not impossible. At a later period, we may be led to suspect the presence of extra-uterine pregnancy, when we discover a premature enlargement of the abdomen above the symphysis pubis—when this enlargement is less uniformly developed, and more irregular in its shape, than in normal pregnancies—when the tumor or enlargement is found in one of the iliac fossæ, or not central in the median line, being easily felt through the parietes of the abdomen—and when upon a vaginal examination, the uterus is found not to have increased in size, nor undergone any change from a firm, unyielding tissue, to one softened and elastic; and very often this organ will be found pressed by the abnormal tumor against some part of the pelvic walls. The cervix is apt to be patulous. Pain is generally present, especially when the motions of the fetus can be felt, and which gradually becomes more severe as its development proceeds. The pain is somewhat similar to uterine pains, and at times it is constant, fixed, and circumscribed in the pelvis, groin, or umbilical region. We may be positive of extra-uterine pregnancy when, having ascertained fetal movements, fetal-heart pulsations, etc., the sound detects an empty state of the uterine cavity. While it exists, some of the symptoms of

pregnancy, as cessation of menstruation, nausea, vomiting, mammary enlargement, etc., may be present; but in many instances these have been absent. There is a discordance of opinions among writers relative to the *membrana decidua*, some of whom assert that the internal surface of the uterine cavity becomes covered with it during extra-uterine pregnancy, while others deny it; among the latter may be named Dr. Robert Lee, of London. But the statements of M. Cazeaux, Prof. Meigs, Ramsbotham, and other investigators, tend to prove conclusively, that the *membrana decidua* is formed within the uterine cavity in abnormal pregnancies. Ramsbotham remarks, "It is a curious circumstance in the history of these cases, that if the child should live until the term of gestation is completed, as soon as that time has expired, the uterus takes on itself expulsive action, which is attended with pain similar to the throes of labor, and during these pains the deciduous membrane is expelled from the cavity, with a slight sanguineous discharge; the same also occurs on the death of the ovum, provided that be premature." See *Nidation*. In these pregnancies we will frequently discover an increase of the uterine volume, with ramollissement, especially during the early stages, and will sometimes find a thick, ropy, gelatinous substance or mucus in the uterine neck. Great care is necessary not to confound extra-uterine pregnancy with displacement of the normally pregnant uterus during the early months, pregnancy complicated with fibro-myoma or cystic disease of the uterus, and, after the death of the fetus especially, with pelvic hemothecle, ovarian tumor, dermoid cysts, cancer, fibro-cystic uterine disease, uterine hydatiform growths, and phantom pregnancy.

The duration of extra-uterine pregnancy is very variable; most commonly it terminates in a few weeks or months; seldom exceeding five months; and occasionally it has continued through a series of years, even as long as forty-six years. It is stated, that in those cases, where it has continued during the full period of labor, there have been at the termination of the ninth month, symptoms simulating labor, as intermittent uterine pains more or less severe in character, a commencement of dilatation of the os uteri, a discharge of muco-sanguineous fluid, and true uterine contractions; and where this condition has continued for several years, these phenomena have recurred at fixed or irregular periods—but they are by no means constant.

The most common termination of extra-uterine pregnancy, is by a rupture of the cyst which incloses the fetus, and which may be effected by a blow, violent exertion, or some similar cause, or it may ensue slowly and gradually. This rupture is accompanied with several

symptoms of a grave nature; at first, there will be severe pain for several hours, and finally an agonizing pain will be followed by tranquillity and a perfect quiet from suffering, with a subsidence or flattening of the abdominal enlargement, or, perhaps, its entire disappearance; the abdominal cavity experiences an increased heat, and the patient, if the development was of some months' date, will feel as if a voluminous body had been displaced; the skin grows pale, faintings come on, the pulse becomes small and contracted, a cold sweat covers the whole body, and frequently death follows, owing to the hemorrhage produced by the rupture of the cyst. Or, if hemorrhage to a copious extent should not ensue, or it should be arrested, violent peritoneal inflammation will be the result. The fetus in all these cases is usually dead, which may have been the result of defective nutrition or some other cause unknown; and if a new cyst is formed, which is sometimes the case, although very dangerous to the mother, it is more favorable, because it may probably form an abscess from which the fetus may be discharged, and thus save the patient's life, or it may permanently hold the fetus while this undergoes several alterations, as hardening, or passing into the state of adipocire, all the fluid parts being absorbed, and the cyst becoming gradually a solid, non-malignant tumor. Again, it may terminate in a sac containing pus, in which the fetus putrefies, and is eventually discharged into the peritoneal cavity, the intestine, or bladder, and which may give rise to violent peritonitis; or, it may become coated with a bony, earthy, or semi-coriaceous crust, and remain comparatively harmless, producing no distress, except that occasioned by its weight and bulk. Indeed death is pretty certain in these cases, from peritonitis, purulent infection, or exhaustion from long continued suppuration.

Extra-uterine pregnancies have been divided into several varieties, each variety being determined by the point of fixation of the ovule, thus:

1. *Ovarian Pregnancy*, is that rare form in which the ovum remains adherent to the surface of the ovary, and is of two kinds—where the ovule is found within the vesicle which held it previous to conception, and where it is partly developed in the abdomen, and partly in the substance of the ovary itself. It may continue for five or six months, when, from the augmented size of the fetus, the cyst ruptures during a paroxysm of pain, and, as found after death, the fetus, with a large amount of blood is expelled into the abdominal cavity. During the presence of this abnormal pregnancy, most excruciating pain about the pelvis, is experienced by the patient from time to time, with con-

stipation and dysuria ; and an examination of the uterus per vaginam, detects it unaltered in size, form, and consistence. The pain is not constant, but regularly or irregularly intermittent, with intervals of ease. But after the rupture of the cyst, the pain becomes more severe, with syncope and finally death from peritoneal inflammation. The existence of this form of extra-uterine pregnancy, is denied by some authors.

2. *Tubar, or Tubal Pregnancy*, is probably the most frequent variety of extra-uterine pregnancy. An arrest of the ovule takes place in some portion of the Fallopian tube, between its fimbriated extremity and its uterine orifice, and at which point the imperfect placenta becomes attached to the inner face of the tubal canal, the walls of the tubes forming the fetal sac. The growth and development of the fetus proceeds for two, three, or four months, rarely seven or nine, when the sac ruptures. In this form of misplaced pregnancy, there is an early enlargement over the symphysis pubis, and a vaginal examination will find the uterus unchanged in size, etc., and movable, but unconnected with the mobility of the tumor. As the fetus continues to grow, the female suffers severe pain in the pelvis, which is increased after the rupture of the sac, and is followed by excessive prostration and death. The fetus is most commonly discharged into the abdominal cavity.

3. In *Ventral, or Abdominal Pregnancy*, the impregnated ovule fails to reach the tube and falls into the abdomen, upon some portion of the walls of which the placenta attaches itself. The pain, experienced by the female in this variety of pregnancy, is situated in the abdomen; the enlargement is found in the iliac fossa, at an early period; upon an examination per vaginam, the uterus, as in the previous species, is found unaltered, and more movable than in any other of the abnormal pregnancies; and the fetal movements may sometimes be observed till the ninth month. The sac, which incloses the fetus, gradually forms adhesions with the surrounding parts, and inflammation most generally occurs, at some period, followed by abscess, which discharges the fetus, in fragments, through the walls of the abdomen, the vagina, the rectum, or the bladder. Cases are reported in which the fetus has remained within the abdomen for forty and fifty years, in a mummified or cretified condition, and others in which normal pregnancy occurred during the presence of the first fetus in the cavity of the abdomen.

There are several other varieties named by authors, to which a brief reference may be made, as, *Sub-peritoneo-pelvic pregnancy*, in which the ovum is situated between the two laminæ of the broad ligament,

where it becomes developed, and which is, probably, the least dangerous of any, as its situation favors the spontaneous expulsion of the fetal debris, and renders them more accessible, should their extraction become necessary; *Tubo-ovarian pregnancy*, in which the cyst surrounding the fetus is partly formed by the ovary, and partly by the opening of the dilated tube, whose extremities have contracted some adhesions with the ovarian tunic; *Tubo-abdominal pregnancy*, in which the cyst is partly made up by the walls of the tube, the placenta being attached to their interior face, while the other portion of the surface of the ovule is in the cavity of the abdomen, and in which cavity the fetus is usually developed; *Interstitial*, or *parietal pregnancy*, in which the ovule penetrates into the midst of the uterine fibers, the cyst being formed by these muscular fibers alone—how this is accomplished, is at present an enigma; *Utero-tubal pregnancy*, where the ovum is retained partly within the tubes, and partly within the uterine cavity; and *Utero-tubo-abdominal pregnancy*, in which the fetus is in the abdominal cavity, the umbilical cord passing through the canal of the tube and into the uterus, to the inner face of which organ the placenta is attached.

In all these abnormal pregnancies, the ovule retains its proper membranes, as the chorion and amnion, by means of the first of which circulation is effected between the mother and embryo, and in those cases where inflammation has been produced by the presence of the ovum in the peritoneal cavity, a membranous cyst is formed somewhat similar to the caducous membrane of the uterus, but undoubtedly not a true decidua.

TREATMENT.—Diagnosis of extra-uterine pregnancy is always difficult. Menstruation is apt to recur in a few months; the peculiar sensations of pregnancy usually experienced by the patient are not always present, and a physician is seldom called until an advanced period, and often only at the time when rupture of the cyst is about to ensue. It is best determined by palpation of the abdomen, and careful vaginal exploration; and may be decided by *exclusion*, after bimanual and pelvic examination, that the abdominal enlargement is neither salpingian nor ovarian; that it is not the result of hypertrophy of the abdominal or pelvic viscera, but must depend, after *excluding* every kind of swelling except that of abdominal pregnancy, on ectopic gestation. The best treatment at this critical period is to execute laparotomy and remove the fetus with its surroundings, as soon as discovered, whether the ovum be dead or alive. Morphine, injected

hypodermically into the fetal cyst, has been recommended to produce the death of the fetus. It has also been advocated that electricity be employed for the same purpose; the object being to prevent the growth of the ovum and ultimate bursting of the sac. If the dead *ætus* remain incarcerated in the abdominal sac, the woman will sooner or later develop septicæmia—the result of putrefactive gases arising from the decomposing fetus. Infection always follows the death of the fetus, though the poisoning in some cases is so slow that it has taken years to wear out the victim. A process of ulceration may establish a fistulous outlet, through which will pass the fetal bones denuded of flesh; as the decomposing mass is cast off, inflammatory action develops, adhesions exist between the pelvic viscera, intestines and sac, rendering separation impossible, and the death of the mother soon follows as the inevitable result.

In the execution of laparotomy, to remove the product of extra-uterine conception, the same general rules should be observed as in ordinary ovariectomy. The following instructions are given by one of the best known writers on surgical subjects: The patient is to be in a clean and comfortable room, on a table, and with clothing fresh; the abdomen is to be sponged, and it is well to have a rubber cloth cover the skin, an aperture having been cut in the cover in the median line to operate through; pans of hot water or antiseptic fluids are to be at hand, and scrupulously clean sponges; all instruments are to be unquestionably aseptic, as well as the operator's hands and arms; the patient is to be kept steadily under the anæsthetic, and it is well to have the limbs tied to the operating table, to prevent troublesome movements of the body. The abdominal incision is to be along the *linea alba*, just below the umbilicus, and extended enough to admit the hand; after division of the peritoneal lining of the abdomen, a quantity of serum may escape, and the fetal envelope come into view, appearing redder and more vascular than the sac of an ovarian cyst. This is to be manipulated to determine the position of the fetus, and to find its connections with the Fallopian tube or with the peritoneal surface of the uterus. Generally, the pedicle of the ovum is as small as that of ovarian tumors in general, but it may be larger or more extensive in its attachments. But, be the pedicle large or small, it must be ligated and then severed with scissors on the distal side of the knot. After the ligature is tied, the sac may be opened and the fetus removed; then the pedicle may be divided a half inch or more outside the line of strangulation. Adhesions are to be overcome before

or after division of the pedicle, as the operator may choose, or as may be convenient.

Scrupulous care should be exercised to arrest all bleeding from traumatic surfaces, and the long rubber drainage tube should be employed. In other words, the management of the case is to be like that of hysterectomy or ovariectomy. If the peritoneal cavity could be made dry and free from coagula, there would be no necessity for drainage tubes, but there is no surety for such an aseptic state. There will be oozing after reaction, and a consequent fermentation. The long drainage tube does not irritate or even create perceptible worry, and is very efficient to carry off septic fluids.

The wound in the abdominal walls is to be carefully closed with deep sutures, the outer end of the drainage tube projecting from the lower angle of the wound. Vomiting on the part of the patient is to be allayed by taking sips of hot water. A hypodermic injection of morphia is to allay great pain, yet is not to be employed unless there is need of an anodyne. Nutritious enemata may be employed on the day following the laparotomy. The drainage tube is to be removed in the course of a week, or as soon as offensive flows cease. The abdominal sutures, which may have been silver or silk, are to be cut and disengaged as soon as the tenth day, and adhesive strips put across the wound to aid the sutures, may be renewed as a protection against ventral hernia in the line of the incision.

The danger in the operation is from peritonitis, and that is caused by septic fluids, which an efficient drainage tube carries away, especially if irrigation be coupled with drainage. Warm antiseptic fluids are to be forced into the perforated tube in quantities to wash and rinse the peritoneal cavity of the abdomen. Especially are the washing and rinsing to be done when there is much febrile disturbance.

There is a condition that may be met with in females at almost any period of life, and whether they have previously given birth to offspring or not, that has been termed *false, apparent, or spurious* pregnancy, and which has sometimes so strongly resembled pregnancy as to deceive very experienced practitioners. There will be found in these cases, cessation of menstruation, morning sickness, sympathetic changes in the mammary glands, enlargement of the abdomen, with other symptoms, even to a resemblance of the true pains of labor. The patient is thoroughly satisfied that she is pregnant, and frequently becomes indignant when this is doubted or denied; and cases are recorded in which the females even suffered from pains supposed to be

those of labor. And yet, when the symptoms present are closely investigated, there will be found some irregularity in their true character and proper development, together with an absence of softening of the cervix, of uterine enlargement, of development of the sebaceous areolar glands around the nipple, of fetal pulsations, of ballottement, etc. A tympanitic distension of the abdomen, when present, will give more or less resonance on percussion. If the patient be placed under the influence of chloroform by inhalation, the semblance of pregnancy will promptly disappear.

But little that is satisfactory is known as to the cause or pathology of this condition; hysterical women, and those who suffer from ovarian or menstrual functional derangements, are more subject to it, and a tympanic distention, in the generality of cases, appears to be the cause of the abdominal enlargement; but the origin of this flatus is yet undetermined. Sometimes the symptoms will continue for a longer time than that of normal gestation, and again they may disappear in a few weeks or months. In all doubtful cases of pregnancy, a very thorough and minute investigation should be pursued by the practitioner, especially of the ovaries, uterus, and abdomen, and any existing malady of these organs be treated according to the indications, while at the same time the general health should be attended to by proper hygienic and other required measures.

CHAPTER XX.

SIGNS OF PREGNANCY.

PHYSICIANS are frequently consulted to decide the existence or non-existence of pregnancy, in cases where it may be of immense importance in determining the reputation of a female, the legitimacy of a child, or even the life of a new being, and in instances when a pregnant woman is condemned to capital punishment. Hence, a knowledge of the signs common to pregnancy can not be too thoroughly understood by the accoucheur. Women with illicit offspring, when suspected and interrogated, will almost always endeavor to mislead us by an obstinate denial, and even by an appearance of much indignation; and this will usually apply to all females, whether married or not, who desire to abort, or destroy their conception. We can not, therefore, be too cautious in giving full credence to the statements of any female upon this subject, unless we have a sufficient acquaintance

with her to justify implicit confidence in her assertions; and we should always depend upon our own knowledge of the symptoms, rather than upon any light we may elicit from the female.

Again, in cases where there is no desire or interest to deceive, as when pregnancy is suspected from the presence of abdominal enlargement, suppressed menstruation, morning sickness, etc., it will often require all the skill of the physician to diagnosticate correctly, and, if an incorrect opinion is pronounced, it will frequently place him in an extremely mortifying situation. It is not many years since, that a celebrated Professor plunged the trocar into the gravid uterus and shoulder of the fetus of a woman, whose condition he mistook for dropsy. I know an instance where a female, supposed to have erred, was examined by two or three physicians, who decided that she was some three or four months advanced in pregnancy; she denied the charge, but it was of no avail; her friends forsook her, and even her parents became harsh, severe, and cold toward her; she pined away in secret, hiding her grief from the world, and in a few months died. An investigation being held, a morbid growth within the uterus disclosed the true cause of her symptoms. Many instances of similar character might here be related, showing the value and importance of a full acquaintance with all the signs which are to guide us in our investigation and decision. We should exercise great discretion, and rely entirely on the indisputable evidence of our senses; not forming our opinion on one symptom, but on a combination of unquestionable symptoms, and if the least doubt be entertained, we should unhesitatingly express it; for it is much safer to remain in uncertainty, than to pronounce an incorrect diagnosis. Females usually suppose themselves pregnant when after intercourse they find a cessation of menstruation followed by an enlargement of the abdomen and fetal movements at a proper time, and generally they are correct, yet all these signs may be apparently without conception present.

To determine a recent conception is not only difficult, but as far as the physician is concerned, absolutely impossible; yet many females resolve this point very correctly, from certain voluptuous sensations, peculiar to each, individually, experienced during a fruitful copulation; and where they have previously given birth to children, having felt similar sensations at the period of fecundation, we have on subsequent occasions, when these occur, some grounds for believing them to be again pregnant. Yet it is commonly the case that "cold women," as they are called, are more easily impregnated than those warm, ardent,

amorous beings who, during copulation, enjoy exquisite voluptuous sensations, with spasms, and nervous agitation.

The dryness of the penis when withdrawn after an embrace, and the retention of semen by the female, are looked upon by some persons as undoubted evidence of fecundation. An anxiety or depressed condition of the woman a few days afterward, paleness of countenance, a dull, sunken, languishing appearance of the eyes, with a bluish circle surrounding them, spots on the face of various sizes, and swelling of the neck, have all been enumerated as signs of early conception, but they are extremely uncertain and doubtful.

It is only when pregnancy has somewhat progressed that we are enabled to diagnosticate with any degree of confidence, and the more advanced this is, the more correctly can we decide. The signs of pregnancy are divided into the RATIONAL and the SENSIBLE; the rational are again subdivided into *general*, *local*, and *sympathetic*.

The *general signs* are those which result from increased activity of the nutritive functions, and from the modifications which take place in the nervous system. The pulse is more frequent and strong, full, and hard; occasionally, in the latter months, intermittent and contracted; the blood is said to be buffy and more plastic; respiration is more active with an augmentation of the heat of the body; and all the secretions are more abundant, with increased odor. The changes in the nervous system are usually the greatest and most remarkable. The sensibilities become more refined, the female becomes more susceptible as well as more liable to moral and physical influences; sometimes her nature appears completely changed, so that those who were kind, loving, and amiable, become peevish, irritable, jealous, and malicious, and *vice versa*; the silent become loquacious, and the talkative become taciturn; in some, the intellect becomes more active, and they are rendered more subject to nervous derangements. If diseases are already existing in the female their further progress is either retarded or more rapidly hastened toward a serious termination. Pregnancy renders the female system more liable to disease, constituting a condition called *puerperal*, which is induced by conception—is more fully developed as pregnancy advances—and reaches its maximum point at childbirth; it then gradually diminishes until after lactation, when it ceases; manifesting itself again, in a greater or less degree, during every subsequent pregnancy. It is owing to this puerperal condition that pregnant and lying-in women are more liable to epidemic and other diseases, and which are usually more rapid and severe at this time than during the ordinary state and habits of the animal economy. Although these signs

are indicative of pregnancy, yet in the early months they are very obscure, and when taken by themselves at any period, very uncertain, affording very little aid in diagnosis unless associated with the others hereafter mentioned.

Among the *local signs*, that upon which females place the greatest reliance, is the *suppression of menstruation*; this is, to be sure, a valuable and most important indication, and one that is very common with pregnant females, yet too much confidence must not be placed in it as an unerring sign. It often happens that women fail to menstruate for one, or several periods in succession, without conception being present, and this may or may not be accompanied with an augmented protuberance of the hypogastric region. This suppression may be owing to cold, functional or organic disease of the reproductive system, or other cause, which should always be carefully investigated with a view to a correct solution. Again, there are many instances where menstruation or a periodical sanguineous discharge is present during pregnancy—others, where females have conceived without any previous monthly flow, and, occasionally, some menstruate regularly, or rather have a periodical discharge of blood, only when pregnant. Usually, when the catamenia have failed in non-pregnant females, there is a greater or less derangement in the general health, but when the health continues in its ordinary condition, with a gradual enlargement of the abdomen, morning sickness, and the development of the glandular follicles of the areola, we have strong reasons for suspecting pregnancy, especially in the married woman. In the unmarried, where illicit commerce is strenuously denied, the diagnosis will be involved in much uncertainty and difficulty; yet the physician should not bestow a too ready credence on the statements of his patient, but rather postpone a positive declaration, until the other signs have advanced so far as to give an undoubted indication of the true state of the case. When the least doubt exists in the mind of the practitioner, he should be very particular not to prescribe or administer any remedies tending to the restoration of the monthly evacuation.

A *change in the color of the vulva*, from its natural pinkish hue to a bluish tint, has been named as a sign of pregnancy; but as this is probably owing to an obstructed circulation, pelvic tumors or other abnormal conditions may produce it. It is usually more marked when the female is in the erect or sitting posture, and disappears more or less in the recumbent.

A change in the color of the skin, called *ephelis*, and sometimes *morph*, or *mask*, accompanies many women during every pregnancy. It is a brownish, yellowish, or earthy colored stain or freckle, of greater or less extent, usually occupying the forehead, cheeks, and even the neck and breast, but is not a constant sign of pregnancy. It is a minor sign, and one, probably, more important among those females who have been disfigured by it in previous conceptions. It often becomes permanent, remaining after parturition, and occasioning considerable uneasiness to the female. Efforts have been made to remove it; success has been reported in several instances, by employing, as a lotion, the saturated aqueous solution of Sulphuret of Potassa, to be applied on the stain three or four times a day, in connection with mild laxative agents to regulate the bowels and restore the cutaneo-hepatic sympathetic relations; but a subsequent conception has always brought with it a return of the dark spot.

Dr. Schlesinger, in an address before the Vienna Medical Society, proposed to determine pregnancy in its earlier months by *thermometry*. From several investigations, he has ascertained that between the axilla and the vagina there is a difference in temperature of 0.21° C., and between the vagina and non-pregnant uterus of 0.16° C.; the cavity of the uterus being of a higher temperature than that of the cervix. The temperature of the fetus in utero is higher than that of the mother, and which is imparted in a certain degree to the uterus. Hence, the gravid uterus is of a still higher temperature than that of the non-gravid. Pulse test: the pulse rate varies in health, from eight to ten beats per minute, depending on the upright or horizontal position; while in pregnancy it remains unchanged—is not influenced by position. This, it is claimed, is the result of an hypertrophied condition of the heart, always existing during pregnancy. Recent observers claim this to be one of the most reliable among the many signs of pregnancy. Further investigation should be made and reported.

Dr. A. Rasch has stated as among the important early symptoms of pregnancy, *the increased desire to void urine, especially at night*, and *fluctuation*, which has been detected as early as the seventh week of gestation, but generally after the second month. Two fingers are to be introduced into the vagina, the womb being steadied through the abdominal walls with the other hand, and then alternately manipulate the uterus with the two fingers. Sometimes the fluctuation will be detected in one corner of the fundus, sometimes lower down; after three months, outward manipulation alone would feel it. When the fingers have diagnosed an enlargement, the practitioner must, of

course, determine whether it be from hypertrophy, tumor, or pregnancy. When anteversion is present, as is more generally the case in early pregnancy, the above manipulation is more readily performed than in retroversion. Fluctuation, combined with increased temperature, softening of the cervix, and the areolar changes of the *mammæ*, is almost a certain symptom.

The *sympathetic signs* are usually confined to the digestive system, and are only useful as means of diagnosis when taken in connection with the more positive sensible signs; they sometimes become so severe and troublesome as to require treatment, for which the reader is referred to the chapter on "Disorders of Pregnancy, and Treatment." Among the sympathetic signs are *nausea*, or *morning sickness*, *vomiting*, *anorexia*, *pica*, *malacia*, *acidity of stomach*, *heartburn*, and *toothache*, which are more common in the earlier months of pregnancy, gradually disappearing in the latter months, being followed by constipation, hemorrhoids, and more or less headache.

All the rational signs, of whatever subdivision, are only important when accompanied with the sensible signs, and when they occur together, the diagnosis is rendered more easy and certain.

The SENSIBLE SIGNS are subdivided into the *visible*, the *audible*, and the *tangible*.

The *visible signs* are those which may be recognized by the eye, as *enlargement of the mammæ*. The breasts, during the earlier stages of pregnancy, acquire new life from sympathy with the uterus; the lactiferous glands are aroused into action, the breasts increase in magnitude, becoming round, tense, hard and tender, with frequently a pricking sensation in them, which sometimes continues during gestation, and at other times the enlargement diminishes about the fourth or fifth month, and may not appear again until near the period of parturition, or even subsequently. Occasionally the axillary glands enlarge.

Simultaneously with the augmentation of the breast, or about the commencement of the third month, the nipples increase in size and sensitiveness, and are sometimes quite painful, they become of a deeper red, and it is often the case that a yellowish or milky fluid can be obtained from them. The surrounding skin likewise becomes tense, thin and more transparent, and the veins more conspicuous. The enlargement of the breasts, and increased size of the nipples are most commonly present during pregnancy, yet taken alone, they can

not be depended on as signs, for pregnancy often exists without them, and again, they may originate from other causes, as ovarian or uterine tumors, amenorrhea, etc.

The *areola*, shortly after conception, becomes changed from its natural pink color to a deep brown, and which is a more valuable sign in first pregnancies than succeeding ones, as in the latter it would be difficult to decide whether the change was owing to the former pregnancy, or the one under examination, especially, if only a short time has elapsed between them. By some medical men, especially Smellie, and Hunter, it was viewed as a positive sign of pregnancy. Cazeaux says, "and I should diagnosticate the existence of pregnancy, with a degree of confidence, in a young woman who had never borne children, and whose breasts presented both a brownish-colored areola, the tubercles (sebaceous glands), and the freckled characters before described." But, notwithstanding, this sign has its objections; it is sometimes absent during pregnancy—it may be modified by the color of the skin, being more distinct in women with dark hair and eyes, and less so in blondes and brunettes; and it has been present when conception did not exist, being induced by disease, as amenorrhea, or organic disease of the ovaries, or uterus; all of which should be considered during the investigation.

With this alteration of color, the papillæ, or sebaceous glands which are seated under the skin of the areola, and especially near its margin, become enlarged, appearing like small tubercles, and which is considered a more positive sign of pregnancy than the areolar discoloration, and more especially so when these enlarged follicles contain sebaceous matter.

The *secretion of milk*, is a sign of some value; yet the accoucheur must remember, that it has occurred in females who were not pregnant, likewise in children; and that cases are on record, where milk has been obtained from the breast of the male. In females, this secretion may be present in consequence of the sympathy existing between the breasts and the reproductive organs in a state of disease; instances of which are frequently met with; consequently, this sign is only of importance when attended with others of a positive character. Beside, it must not be forgotten that disease may give rise to the discharge of a fluid apparently resembling milk, but differing from it in many respects.

Enlargement of the abdomen, affords to the public a strong presumption of pregnancy, because it is an invariable concomitant of this condition. Yet a mere dependence on this sign will often deceive us, as

it may be present from many other causes than pregnancy. Thus, the accumulation of adipose matter in the omentum and walls of the abdomen, ascites, uterine and ovarian tumors, amenorrhea, tympanitis, etc., will cause its enlargement. An appreciable increase of size, in the abdomen, is commonly observed about the third month, and if with it we have enlargement of the breasts, areolar changes of the mammæ, cessation of menstruation, increased uterine temperature, fluctuation, with usual health, and previous morning sickness, the inference is strong that conception exists; yet even these may mislead us; hence, the necessity for great caution in forming a diagnosis on this subject, can not be too strongly enforced.

Previous to the third month, or soon after conception, the abdomen generally becomes flat, its anterior wall retracts, and approaches toward the vertebral column; but about the third month, it commences to project, first on the median line, gradually increasing and extending from the pelvic to the umbilical and epigastric regions, reaching this last at full term, and leaving a sunken, or depressed appearance over the iliac fossæ. In women who have had several children, the abdomen inclines more forward and downward, from laxity of the parietes, while with those in their first pregnancies it is usually less projecting, but larger and more uniform. The volume of the abdomen, at different stages of gestation, likewise varies from several circumstances, as twins, anniotic dropsy, etc. If, with the above appearances, we ascertain that the umbilicus is sunken at first, and then becomes gradually more prominent as the projection of the abdomen proceeds, our suspicions of pregnancy are still further corroborated. During the latter months of pregnancy the umbilicus may be thrust forward from one-fourth of an inch to even an inch beyond the anterior surface of the abdomen; and this projection may also originate from the presence of pathological tumors within its cavity.

Quickening, a term applied to a fluctuation, or fluttering sensation, experienced about the end of the fourth month, may be mentioned in connection with the augmentation of the abdomen. By some authors this is considered as the result of life being imparted to the fetus at the time it is felt; by others, it is viewed as being caused by the impregnated uterus when rising from the pelvic excavation, etc. It is undoubtedly owing solely to the fetal movements, which take place as soon as the embryo attains size and strength sufficient to make its motions felt by the mother, and which generally commences about the eighteenth or twentieth week of utero-gestation. However, pregnancy may exist, and no quickening have been experienced by the

mother ; again, females often mistake other sensations for this symptom, as a flatulent motion, etc.; yet, if the sensation continues to increase in strength, until the fetal movements can be distinctly felt, all doubts will of course be removed. If, during the latter months of gestation, firm and continued pressure be made by the fingers against opposite sides of the uterus, it will produce such disturbance to the fetus, as to make it move vigorously; or, if one hand be placed on one side of the abdomen, and the same point on the opposite side be struck with the other hand, the fetus is very apt to move actively. The motions of the child, if it be alive, may likewise be determined, by dipping the hand in a bowl of cold water, and applying it suddenly over the abdomen. It must be borne in mind, that although the motions of the fetus are a strong evidence of pregnancy, yet its absence does not prove the reverse condition, as the child may be dead, or very feeble. In the strict sense of the word, *quickenings* really occurs at the period of conception.

Among the *visible signs*, may be named a peculiarity observed in the urine of some pregnant women, first described by M. Nauche, in 1831, and after him by several other gentlemen. The urine on being allowed to stand in a glass for some twenty or twenty-four hours, presents on its surface a number of brilliant, crystalline granules, resembling small specks, or oblong filaments, irregularly isolated, which often unite, forming a transparent layer or pellicle about a line in thickness, which can only be seen in certain positions. After a few days a portion of this pellicle gradually falls to the bottom of the glass, forming a white, milky crust there. At one time this pellicle was considered a positive proof of pregnancy, but the investigations of Dr. E. K. Kane, of Philadelphia, have determined, that *kiesteine*, the name given to this material, is not peculiar to pregnancy, but may occur during the presence of milk in the breasts, especially if it be not freely discharged from the mammæ, and that its presence is rather an indication of the existence of this mammary secretion, than of pregnancy.

The *audible signs*, are those detected by the ear, with or without the aid of the stethoscope, among which is, the *placental sound*, or *bruit de souffle*, which is variously represented as resembling the blowing of air, the cooing of a dove, the drone of a bagpipe, having a peculiar rasping sound, similar to that which is heard in the carotid arteries of chlorotic females, in varicose aneurisms, and in some cardiac affections; this sound is owing to the arterial and venous circula-

tion of the walls of the impregnated uterus, as well as to pressure upon the arteries, and not to the utero-placental circulation; it is always synchronous with the mother's pulse, and is occasionally heard in the course of the linea alba, but more frequently on the sides of the abdomen, over the course of the iliac arteries; sometimes it can be heard over a large extent of surface. When the female is placed in such a manner as to remove the pressure of the gravid uterus upon the arteries, as upon her knees and elbows, this sound can not be heard; and there are cases in which it can not be detected, although the motions of the fetus may be distinctly felt. It is first heard about the fourth or fifth month of pregnancy, though some writers profess to have observed it even before the end of the third month, and becomes more audible as gestation advances. This is neither a constant, nor a positive sign of pregnancy, for it may be owing to various other causes, as aneurism, abdominal tumors, or whatever may compress the arteries, and has been heard even after delivery; hence, but little confidence is bestowed upon it at the present day.

Dr. Verardini in an address before the Academy of Bologna, stated that intra-vaginal auscultation is of the greatest importance for detecting early pregnancy, and will enable us to avoid many possible errors. The instrument, vagina-uteroscope, may be made of gutta percha, very light, and of various shapes. By pressing the vaginal extremity of the instrument against the cervix uteri, if pregnancy exist, a soft, prolonged sound is heard, similar to that heard in aneurismal tumors when the stethoscope is pressed upon the arteries, this is the characteristic utero-placental bruit. The examination may be made with the patient lying upon her back or side; but if no sound be heard in this position, the female should be placed in the knee-elbow position, when the auscultator will succeed without difficulty. The bruit which is distinctly heard during the first months, ceases at the commencement of the sixth or seventh month. If the bruit be absent while other symptoms common to early pregnancy are present, the diagnosis is uncertain, as there may be uterine disease. In making the examination, it is important to be certain that there is no pulsating tumor or artery in the vicinity of the cervix. If the bruit continues to be heard after the seventh month, it is indicative of placenta prævia.

The *sound of the fetal heart*, differs entirely from the placental souffle; it closely resembles the ticking of a watch, and differs materially from the mother's pulse in frequency and rapidity, beating from one hundred and twenty to one hundred and forty in a minute, the pulsations being sometimes so rapid as to render it impossible to

count them, but returning to their natural character, without any cognizable cause.

The pulsations of the fetal heart are first perceptible between the fourth and fifth months, and are more commonly heard on the anterior inferior portion of the abdominal wall, just above the iliac fossa, occasionally on the median line, and over an extent of two or three inches; as the fetus advances in growth the pulsations become more marked.

These pulsations, whenever they can be heard, afford positive evidence of pregnancy, yet their absence is no indication of non-pregnancy, as the fetus may be dead, very feeble, or it may be in a position unfavorable to the transmission of sound to the ear; or an excessive quantity of the liquor amnii may destroy the sound. The presence of twins, and even the position of the child in the uterus has been attempted to be determined by the presence of these pulsations, but from the discordant and contradictory statements made by authors in relation to these points, no confidence can be placed in them; though if the sound of the fetal heart should be heard emanating from two different points, and especially when non-synchronous in action, or of different rhythm, it would be of some value in the diagnosis of twins. In auscultating a female suspected of pregnancy, especially during the fourth, fifth or sixth months, it is advisable to have her lie upon her back, with the thighs flexed upon the abdomen; the bed should be of a height sufficient to allow the practitioner to auscultate without stooping too much, which would render it impossible for him to hear any internal sound. The stethoscope, and not the ear, should be applied to the abdomen, which is less disagreeable to females, and it should be placed, first, over the part where the pulsations are most commonly heard, and then changed as may be required.

The *tangible signs*, or those which are ascertained by the touch, are exceedingly important in assisting us in our diagnosis of pregnancy, for by them we are not only enabled to determine this condition, but also its degree of advancement; hence, every practitioner should fully qualify himself to perform this operation of touching or manual examination.

The examination per vaginam or vaginal touch, is usually made by means of the index finger, which is always preferable to the middle finger, as recommended by some writers; occasionally, however, it may become necessary to introduce both index and middle fingers at the same time; this, however, is usually done for the purpose of reach-

ing more deeply into the vagina, and the touching should be accomplished with the index finger alone, for if both are employed, there may be a double perception, and an uncertain, confused idea of the condition of the parts under examination. The practitioner should be able to manipulate with either hand, as occasion should require, and should be very careful that his finger nails are not too long or pointed, in order to avoid giving pain or injury, as well as to render the touch more easy, delicate, and certain; long finger nails, in an accoucheur, manifest negligence and carelessness, and are always inexcusable. The finger, in order to admit of its easy introduction, should be anointed with oil, lard, pomatum, butter, etc., and not with mucilaginous liquids, as advised by many, because these last do not adhere so firmly to the skin, and are less apt to protect the finger, especially if there be excoriation of it, from the absorption of any infectious virus which may be present. As to the length of the finger necessary to become an expert accoucheur, that is of little consequence, as the shortest fingers and smallest hands become as perfect in this art, as the longer and larger.

The female may be placed in the erect, recumbent, or sitting posture, according to the circumstances; thus, for *ballotement*, or for the detection of uterine displacements, the erect position should be assumed; to ascertain the advance of pregnancy, the size of the uterus, tumors, etc., the recumbent position is the best, with the female lying upon her back or side; the latter is preferable in these cases, with the head and chest elevated and inclined forward and the inferior extremities separated and flexed as much as possible on the abdomen, so as to relax the abdominal muscles, and consequently render the examination more easy. In some instances where the erect position can not be maintained, or where the recumbent would give rise to suffocation, as in debility, dropsy, dyspnœa, etc., the sitting posture will be found the best, in which the patient is so placed upon a chair that the weight of the body rests upon the sacrum, the body being inclined backward and the vulva being beyond the edge of the chair, so as to allow the operation to be performed. If the patient be standing, the physician should place himself in front, resting on that knee opposite to the operating hand, with the other knee, demiflexed, and placed between the limbs of the female, to act as a support for the elbow to lean upon, thus preventing the hand from trembling, and allowing the examination to be made more easily. If she is in the recumbent position, he will place himself on that side of his patient corresponding with the hand he intends to employ, and should be seated on a chair of a suitable height. The

woman, in whatever position she may be placed, must not be exposed, but have a proper covering over her.

The extended hand of the operator is now to be passed lightly and quickly along the internal surface of the thigh nearest to him if she lies on her back—or of the lower one if she lies on her side—toward the nates, and as soon as it is arrested by the soft parts, and the fissure between the nates recognized by the index finger, this must then be carried forward toward the vulva. Some writers advise the finger to be carried to the symphysis pubis and then moved downward and backward; but in doing this, friction against the clitoris and meatus urinaris must necessarily ensue, but which should always be carefully avoided. The practitioner must be careful not to commit an error by introducing the finger within the rectum, instead of within the vagina, indeed, this could only happen from inattention, or an inexcusable carelessness. On finding the vaginal opening, the condition of the external labia, its size and firmness must be ascertained by passing them between the thumb and index finger, and the fourchette may also be detected if there has been no previous labor, but if there has been, it will be absent, and its place supplied with inequalities. The finger is then to be pressed nearly backward with its palmar surface directed toward the symphysis pubis, examining, as it passes along the urethral canal, which is generally more swollen in pregnant women than others, the condition of the mucous membrane of the vagina, whether smooth or wrinkled, whether any abnormal conditions of its walls are present, and the width and length of the vaginal canal.

When about one-third of the finger has passed into the vagina, the wrist is to be strongly depressed, and the finger directed nearly vertical, when the *bas fond* of the bladder, the vaginal cul-de-sac, and cervix uteri may be examined. At this time of the operation the thumb is to be extended and applied against the anterior face of the symphysis pubis; the other three fingers will vary in position according to circumstances, being generally extended on the perineum, pressing it upward, and sometimes flexed with the thumb, into the palm of the hand, for the purpose of ballottement, or for examining the parts on the anterior plane.

However, if the female lies upon her side, with her back toward the practitioner, the positions of the fingers will be nearly reversed, the palmar surface of the index will be looking toward the sacrum, and the other fingers and thumb more or less flexed in the palm.

The same method of introducing the finger may be pursued for the detection of malformations of the pelvis, the dilatation of the os uteri,

the presentation of the fetus, etc. The various changes which the neck of the uterus undergoes during pregnancy, have already been described, and to which the reader is referred.

Abdominal palpation or exploration, may assist us in forming a correct diagnosis of pregnancy, and can be practised in all cases, with a few rare exceptions, which may be owing to an excessive thickness of the abdominal walls. In making this examination the female must be placed in a recumbent position, on her back, with the hips elevated, the head flexed on the chest, and the thighs on the abdomen, which position completely relaxes the abdominal muscles. At first, both hands are to be applied over the abdomen, to determine its size, form, and hardness, more especially in the hypogastric region.

To ascertain the growth of the uterus, the practitioner will place the ends of the eight fingers immediately above the symphysis pubis, and make deep but gradual pressure until they feel the resistance of the uterine globe; and in this manner he will continue to ascend gradually along the abdomen until the fundus is gained, which may be known by the absence of any further resistance, and by the fingers sinking deeper and gliding over the convexity of the fundus. If pain should accompany the examination, or if the abdominal muscles be in a state of great tension, further procedure must be postponed until a more favorable occasion. The uterine globe invariably retains its oval form, is circumscribed, presenting a resistance somewhat of an elastic character, and which is firmer in the early months of gestation than during the latter; and the practitioner will often be enabled to recognize movable, irregular masses, and even the various parts of the fetus, depending upon the period of pregnancy in which the exploration is made. The elastic character of the uterine parietes is not so appreciable when the enlargement of the organ is dependent upon chronic disease, and should it be owing to the presence of a mole within its cavity, it will be impossible to decide, unless at an advanced period, when the absence of the fetal movements, of the pulsations of the heart, and of the fetal inequalities, may furnish grounds for such a supposition.

The vaginal touch is usually practiced at the same time with the abdominal exploration, especially in the earlier months of pregnancy. The finger introduced within the vagina, is applied on the neck, or against that portion of the uterus between the neck and the symphysis, or between the neck and the sacrum, while the other hand is placed above the pubis, pressing firmly to recognize the uterine tumor. The

womb being thus located between the finger within and the hand without, the degree of its enlargement may be ascertained, by instituting a comparison between it and the non-gravid organ. Again, the finger may elevate the uterus, which will be recognized by the hand, or the hand may depress the organ, which will be felt by the finger, and thus its condition and situation as well as any fluctuation, be determined. However, during the first three or four months there are no unequivocal signs of pregnancy, and the practitioner will often be mistaken should he depend on any of them at this time, yet he may, in nearly all instances, satisfy himself of the unimpregnated condition of the uterus.

Another mode of determining the presence of pregnancy, is from the passive movements of the fetus in utero, and which is called *ballottement*; these motions depend upon physical laws, and are entirely independent of the vitality and muscular strength of the fetus, as they are present whether it be dead or alive. As a certain size and weight of the fetus is required for ballottement, it can not be produced in the early months of gestation, or if it can, it is imperceptible. The sensation of ballottement is, according to most writers, analogous to that produced by striking a marble ball, which has been placed in a bladder full of water, or in a glass tube likewise filled with water suspended in a vertical position, with the lower end closed by a diaphragm of bladder or parchment. The blow is to be given with the palmar face of the finger applied just under the spot where the ball rests, striking from below upward, when the ball ascends in proportion to the force of the blow, and when this force is exhausted, it descends and falls back upon the finger which displaced it, communicating a shock to it, and which motion and sensation constitute ballottement.

To perform the ballottement, the female should be standing, with her shoulders placed against some solid body, as a wall, to cause a projection of the abdomen. The finger, properly oiled, is then to be introduced into the vagina as far as the neck, and should be applied anteriorly, on that portion of the uterus between the symphysis pubis and the projecting portion of the neck, at which point a smart blow is to be given, sufficiently strong to cause the fetus to ascend; the blow should be made from below upward, and from behind forward, which last may be effected by suddenly flexing the first phalanx as the shock is imparted. As the uterus is generally inclined forward with its long diameter corresponding somewhat with the axis of the superior strait, this last direction of the blow will be required to cause the fetus to

ascend in the direction of the uterine long diameter, otherwise, it will merely be pushed against the posterior wall of the uterus, being displaced without ascension. At the time the blow is imparted, the operator should place his other hand upon the abdomen, over the fundus, to firmly fix the uterus in its position, and a short time after the shock has been communicated to the fetus, he will press upon the fundus from above downward, to hasten the descent, and thus increase the intensity of the sensation to be experienced by the finger within the vagina, which finger is to be held firmly and steadily against that portion of the uterus which has been struck, until it has received the shock of the descending fetus, or until a sufficient length of time has passed for that result. Ballottement is best obtained when the woman is in the erect position; yet, there may be cases in which, from inability to stand, the recumbent posture may be employed, when the operator will have to place the finger at various points both anterior and posterior to the vaginal projection of the cervix.

Ballottement may be effected at the fourth month of utero-gestation, though it is frequently absent during this as well as the fifth month; at the sixth or seventh month it is very distinct, and conveys a sensation similar to that of a solid ball inclosed in a fluid and falling upon the finger, as above described. As the fetus continues to grow, ballottement becomes less distinct, is hardly perceptible at the end of the eighth month, and is impossible in the latter weeks of pregnancy. During the early period of ballottement it may be advisable, in cases where accuracy is absolutely required, and in which it can not be recognized, to make several trials; as from the fact that the small size of the child allows it to easily change its position, this sign may be present one day, and be quite impossible to detect at another.

By many authors ballottement is considered as a pathognomonic symptom of pregnancy, being equally applicable to the dead or living fetus, and, indeed, we know of no other cause to produce it, than the actual presence of a child within the uterus. However, the practitioner should always ascertain that there is no displacement of the uterus which might create a mistake, as in anteversion, and also that the shock communicated to his finger is not from stone in the bladder; each of these conditions, has, heretofore, occasioned some difficulty in determining true ballottement.

From what has been stated, it will be observed, that in order to determine the condition of pregnancy with certainty, the practitioner will be obliged to procure a delay until the motions of the fetus and

other signs are manifested with force and distinctness, and which usually will be at the fourth or fifth month; though, from feebleness of the fetus he may have to wait for a still longer period. In all difficult cases, the physician, when called upon, should never positively affirm the existence of pregnancy, until he has distinctly perceived the pulsations of the fetal heart, ballottement, and the proper changes in the condition of the uterus; in ordinary cases, an experienced practitioner can form a correct diagnosis from these last uterine changes; the rational signs afford but little evidence of any value or certainty.

Occasionally, the physician is called upon to determine the stage of pregnancy; this is often very difficult. However, reference should be had to the length of time which has elapsed since the last menstruation, the position of the fundus uteri, the condition of the cervix, ballottement, auscultation, and the time of quickening, if it have taken place, and from all which, an approximation to the period of gestation may be obtained. As to the sex of the fetus in utero, I know of no method of determining it; Drs. T. J. Hutton and Braxton Hicks have stated, however, that this may be determined in most cases by auscultation practised toward the end of pregnancy. If the fetal pulsations number from 138 to 144, the child is probably a female; from 124 to 130 it is probably a male. Steinbach was correct in 45 out of 57 cases examined by this method, and Frankenhäuser was correct in all the 50 cases which he examined. And Dr. Hutton further remarks that if the uterus be divided into two equal parts by an imaginary horizontal line, fetal pulsations heard below this line indicate a presentation of the vertex; above it, of the nates; and below it and to the right, of the second vertex position. Neither is there any reliable mode of ascertaining the presence of twins, further than already stated.

SYNOPSIS OF THE SIGNS OF PREGNANCY AT DIFFERENT STAGES.

During the First and Second Months.

RATIONAL SIGNS.

1. Suppression of the catamenial discharge.
2. Nausea, vomiting, ptyalism, anorexia, etc.
3. Unnatural flatness over the hypogastrium.

SENSIBLE SIGNS.

1. Increase in the size and weight of the uterus, with slight prolapsus. The cervix uteri is directed to the left and toward the symphysis pubis, fluctuation, increased temperature.

RATIONAL SIGNS.

4. Tumefaction and tenderness of the mammae.

SENSIBLE SIGNS.

2. Diminished mobility of the uterus, its walls soft like caoutchouc.

3. The os uteri round and regular in primiparæ, but in multiparæ, irregular in its circumference and more or less open.

4. Ramollissement and apparent œdema of the mucous membrane, covering the lips of the cervix uteri. The fibers of the neck not yet softened.

During the Third and Fourth Months.

1. Suppression of the catamenia (an occasional exception).

2. Continuance of nausea, vomiting, anorexia, ptyalism.

3. Slight prominence over the hypogastrium.

4. Depression of the umbilicus.

5. Tumefaction of the breasts increased, with prominence of the nipple, and a slight discoloration of the areolæ.

6. Kiesteine in the urine.?

1. The fundus uteri elevated rather above the superior strait, at the end of the third month. At the termination of the fourth month, it rises two or two and a half inches above the pubis.

2. Fullness, and dullness on percussion over the hypogastrium.

3. Existence of a small tumor in the hypogastric region, detected by abdominal palpation, about the size of a child's head a year old.

4. The direction of the long diameter of the uterus is now changed, so as to correspond with the axis of the superior strait. At the fourth month the os uteri is considerably elevated in the excavation, looking backward and to the left; increased temperature.

5. Ramollissement of the inferior portion of the cervix is more marked; os uteri more open in the multiparæ, but still closed and rounded in those who have not borne children.

During the Fifth and Sixth Months.

1. Suppression of the catamenia. (Some rare exceptions.)

2. Cessation of nausea, vomiting, etc., now usually takes place, though they may continue throughout pregnancy.

3. Increased prominence of the sub-umbilical region.

4. The size of the abdominal tumor is increased, it is round, elastic, and if the abdominal walls be thin, the inequalities of the fetus may be felt.

1. At the end of the fifth month, the fundus uteri is within an inch of the umbilicus, and the same distance above it at the sixth.

2. Movement of the fetus is now active.

3. The bruit de souffle and the fetal pulsations may now be distinguished.

4. Ballotement.

5. Between the cervix and the pubis a tumor may now be felt, either soft and fluctuating, or round, hard, and resisting.

RATIONAL SIGNS.

5. The umbilical depression nearly effaced.

6. Discoloration of the areolæ more marked, with an enlargement of the subcutaneous glands.

7. Kiesteine in the urine?

SENSIBLE SIGNS.

6. Ramollissement of the inferior half of the cervix uteri; increased temperature.

7. In the primiparæ, the os uteri is still closed, but in the multiparæ, it is sufficiently open to admit the half of the first phalangeal bone, although in each it is softened to the same extent.

During the Seventh and Eighth Months.

1. Suppression of the catamenia.
2. Nausea, vomiting, etc., ordinarily absent.

3. Abdominal tumor much increased in size.

4. Dilatation of the umbilical ring, and pointing of the navel.

5. Increased discoloration of the areolæ, with enlargement of the sebaceous follicles, and increased prominence of the nipple. The milk may be pressed from the swollen mammæ.

6. Discolorations on the skin of the abdomen.

7. Vaginal-granulations.

8. Kiesteine still exists in the urine?

1. Increased size of the abdomen.

2. The fundus uteri, at the end of the seventh month, has risen two and a half inches above the umbilicus; at the eighth, it is placed within the epigastric region; uterus commonly inclined to the right.

3. Movements of the fetus become more violent.

4. The fetal pulsations and the bruit de souffle still continue.

5. Ballotement perfectly felt during the seventh month, but becomes obscure in the subsequent months of pregnancy, on account of the increase in the size of the fetus.

6. The ramollissement of the cervix is more extensive, and at the end of the eighth month is nearly complete; increased temperature.

7. In the primiparæ, the cervix is ovoid and apparently shortened; the os uteri is still closed.

8. In the multiparæ, the os uteri is conoidal and wide enough open to admit the whole of the first phalangeal bone; the superior fourth of the neck still hard and firmly closed.

During the First Half of the Ninth Month.

1. Reappearance of vomiting, not from nausea but from pressure of the gravid uterus against the stomach.

2. The abdominal tumor is increased in size; skin much stretched and tense.

3. Respiration difficult.

4. All the other symptoms remain and are augmented in intensity.

1. The fundus uteri occupies the epigastric region.

2. The movements of the fetus; the pulsation of the fetal heart and bruit de souffle are still present. At this time ballotement has disappeared.

3. The whole cervix uteri is softened, except the internal orifice, which remains

RATIONAL SIGNS.

SENSIBLE SIGNS.

firm and closed. The os uteri in primiparæ is slightly opened, though not sufficiently to admit the finger, as in the case in multiparæ, although the softening is equally extensive in each; increased temperature.

During the Last Half of the Ninth Month.

1. The vomiting ceases, as the abdominal tumor sinks from the epigastrium.
2. Respiration less oppressed.
3. Considerable difficulty exists in walking, owing to the sinking of the presenting part into the pelvic excavation.
4. Constant and ineffectual desire to evacuate the bladder and rectum.
5. The hemorrhoids, the œdema of the limbs and the varicose condition of the veins of the inferior extremities are all increased.
6. Pains in the loins, and colics.

1. The fundus uteri has sunk low down in the abdomen.
2. The sensible signs still persist, except ballottement, which is usually, though not always, absent after the fetus has acquired considerable size.
3. In multiparæ, the internal orifice of the cervix is softened and dilated, so that the membranes may be felt. In the primiparæ, the internal orifice is soft and dilated, but the external remains partially closed. During the last ten or twelve days, owing to the dilatation of the internal orifice of the cervix uteri, the whole cavity of the neck becomes enlarged, so as to increase the size of the uterine cavity; so that *in touching*, the finger reaches the membranes, in the primiparæ, after having passed the thin and even margin of the os uteri. While in the multiparæ, this margin is thick and unequal.

CHAPTER XXI.

DISEASES OF THE PREGNANT FEMALE.

BETWEEN the uterus, and every part of the body, a strong nervous sympathy exists, owing to the intimate relation maintained between the sympathetic and cerebro-spinal system of nerves; and this sympathy is more especially marked during the condition of pregnancy, when the ganglia and plexuses of nerves, together with the blood-vessels and absorbents of the uterus enlarge, and become roused from a state of apparent inertia to one of energetic activity. This change in the female system gives rise to many symptoms, which may

be considered as *indications* of the healthy act of conception, and which, as a general rule, should not be meddled with; but, when they become unusually severe or protracted, they are then termed the "diseases of pregnancy," and require proper treatment for their palliation or removal. As pregnant females are liable to the same diseases as the unimpregnated, it would require a volume to treat separately upon them; I shall, therefore, confine this part of the subject to those conditions more common during pregnancy.

When the female is supposed, from the presence of the ordinary symptoms, to have become pregnant, certain measures are necessary for her to pursue, as well for her own benefit as for that of her offspring. All compression upon the abdomen or around the waist, such as stays, corsets, belts, etc., should be removed, modified or worn loosely, and should not be resorted to until after parturition; an attention to this point may prevent abortion, varices, œdema, uterine, and other disease, on the part of the mother, which difficulties are very apt to be the result of pressure and consequent obstruction of the portal circulation, as well as of the great arterial trunks and veins of the abdomen; and on the part of the fetus, hydrocephalus, deformity, or positions which may render the labor tedious and even fatal. She should likewise be especially observant of her diet, selecting that which is the most nutritious as well as most easily digested, bearing in mind, that the gastro-uterine sympathy, as well as the gradually increased volume of the uterus, tend greatly to diminish the energy of the digestive powers. Stimulants especially, as alcoholic, vinous, or malt liquors, fats, much acidulous food, and in instances where they prove decidedly hurtful, tea and coffee, are to be avoided. The use of farinaceous vegetables, ripe fruits, boiled or roasted meats, water, and milk, may be named as among the best kinds of food and drink; and, though many females may have indulged their appetites without any resulting unpleasant symptoms, yet such a course is more apt to produce various difficulties than is generally supposed, especially upon the future of the fetus. Moderate exercise in the open air, especially during the early months of pregnancy, should be very strongly advised, with only occasional and not too prolonged bathing. Coition, though commonly indulged in during pregnancy, is extremely unwise and improper; and though often practiced with impunity, yet it is very apt to be followed by metrorrhagia, abortion, or some defect in the mental or physical organization of the offspring. Females subject to leucorrhea, immoderate menstrual evacuations, abortions, as well as

those of a nervous or impressible temperament should be particularly warned against cohabitation during pregnancy. If parents desire physically and mentally healthy offspring, the sexual passion must be permitted to remain dormant or undisturbed during the period of gestation. The symptoms or diseases of pregnancy, which frequently require medical treatment, are first, those which are the result of deranged circulation and nervous sympathy; second, those originating from the compression of the enlarged uterus upon the neighboring organs; third, diseased conditions of the uterus or its contents; and fourth, accidental diseases.

Among those symptoms depending probably upon deranged circulation and nervous sympathy, one of the most common, as well as the earliest, is *vomiting*, or *morning sickness*, as it is usually termed. Various explanations have been given from time to time as to the cause of this phenomenon, but none of them are wholly satisfactory. With the major part of females it is the first sign of pregnancy, commencing usually about the fourth or sixth week, and sometimes immediately after conception, and continuing for a few months, or even up to the parturient period. It partakes of the character of sea-sickness, or of that experienced by persons commencing to smoke tobacco. The female experiences more or less nausea from the time of rising in the morning, which may at first be removed by eating the morning meal, but which soon becomes followed by vomiting of a greater or less degree of severity and duration; occasionally, the vomiting becomes exceedingly violent, everything being rejected from the stomach, and if not checked, the female may die from exhaustion or starvation; or premature labor may ensue, followed by hemorrhage of an alarming character. Where the vomiting occurs during the first three or four months of pregnancy it is dependent upon gastro-uterine sympathy—is principally confined to the morning, lasts from ten minutes to an hour or two, each day, and usually ceases in from two to four months; the matter evacuated is thick, slimy, colorless, greenish or blackish, frequently acid, and if the effort at vomiting be severe, a little bile or even blood may be mixed with it. This sympathetic vomiting seldom falls under the practitioner's care, unless it becomes very severe; and indeed, no especial means are required for its removal when not too violent or prolonged, as it is merely a normal effect of conception.

When the vomiting occurs only in the morning, and is comparatively slight, it may be palliated by some aromatic infusion, and if the discharges are very acid, magnesia, alkalies, with aromatics, or char-

coal, will be found efficient; sometimes these agents will exert but little effect upon the acidity, in which cases, they will have to be laid aside and acids employed, as Lemon-juice and water, a solution of Tartaric or Citric acid, or acid wines. Should the discharges contain much bile, mild cholagogue laxatives will be found beneficial, as a combination of two parts of Rhubarb and one of Bicarbonate of Potassa, administered three times a day, in doses of eight or ten grains of the mixture, or sufficient to produce one or two mild alvine evacuations, daily; may also use Citrate of Magnesia, or Seidlitz powders. When the vomiting is accompanied with much pain in the stomach, Sp. Tr. Nux Vomica or Ignatia, with counter-irritation to the epigastric region, may be employed with advantage; and in severe and obstinate cases of pain I have succeeded in giving relief, when other means have proved inutile, by applying a hot fomentation of water over the epigastrium, together with hot sponging, Chloroform, Aqua Ammoniae, or a Sinapism.

When the vomiting is violent and obstinate, various means have been advised, all of which have at times proved beneficial; it must be remembered, that while a certain course may produce a good influence on one patient, it may have no effect whatever upon another, hence the necessity of an acquaintance with these several means. As severe vomiting is frequently accompanied with gastric or hepatic derangement, Chionanthus or the small Podophyllin pill often controls it. Macrotys will control a larger number of these cases than any other single agent, and though it may fail in the beginning, I often prescribe it again, after having exhausted the list of remedies, and in this way frequently succeed; Pulsatilla is also a good agent, especially when nervous excitation is present. They may be used singly, in alternation, or together. In cases where the circumstances of the patient will allow, Champagne wine, according to Prof. Meigs, taken during the meal (should vomiting occur after the meal) will almost always prevent it. I have occasionally met with severe cases of vomiting, in which, after the employment of the usual remedies without effect, Lobelia has produced the desired influence; in such cases, I have rubbed together one drop of Oil of Lobelia and thirty grains of Sugar, and given one-sixth of the mixture for a dose, repeating it every ten or fifteen minutes until relief ensued, which generally followed the first or second dose, rarely requiring a third or fourth. Notwithstanding all these remedies, it will happen, sometimes, that no relief will be experienced, and the patient continues to suffer up to the fourth

month without any amelioration of her condition; yet, even in such cases, the physician should not add to her suffering by giving up the case as beyond remedial action, but should cheer her up, and endeavor to fortify her spirits by the anticipation of better effects from the next means to be used. In some instances food is only retained while cold; and in others nothing will lie on the stomach but what is hot. Ice will sometimes check it, and bismuth has a good effect. Effervescing draughts have been extolled in attempts to allay the sickness, and will often give satisfactory results, as Seidlitz powders, Soda or Mineral water.

The use of peptics is to be commended.

Acidulated camphor water makes a pleasant drink, and will, in some cases, control a rebellious stomach, where other agents fail; Fowler's solution of arsenic, administered in drop doses on an empty stomach, or with a restricted diet, has been highly commended. I have succeeded in overcoming obstinate cases, in several instances, by the use of Macroty's and Fowler's solution in alternation. Prof. Howe speaks of the alternate use of these agents, and says he has long considered arsenic as the specific for the vomiting of pregnancy. Many other agents have been used and recommended for this distressing symptom, as Bromide of Potassium, Creosote, Turpentine, Salicin, Lime water, Oxalate of Cerium, and infusions of Peach and Wild Cherry-tree bark, etc., etc. In fact, there is scarcely anything considered remedial that has not been tried in the vomiting of pregnancy.

In persistent nausea, with inability to retain any kind of food on the stomach, and having exhausted the list of internal remedies, I have succeeded in subduing the trouble, temporarily, or until food could be taken, by the hypodermic injections of Morphia. Dr. Girabetti states that he has successfully treated obstinate cases of this character by rectal injections of solution of Bromide of Potassium, commencing with 90 grains of the salt the first day; 120 the second; and 150 the third day—and then lessening the dose in proportion to the effect. Dr. Simmons has met with a similar success by rectal injections, morning and evening, of a solution in mucilage of 30 or 40 grains of Hydr-chloral. We do not commend such heroic measures, however, believing milder means to be more effectual. Carbolic acid, in the *dose* of from one-fourth to one-half a grain, in a teaspoonful of glyc-*erine* or mucilage, and repeated three times a day, has likewise proved effectual in certain cases, especially when gastric acidity, flatus, or fer-

mentive dyspepsia was present. In all these cases, the diet should be of the lightest character, and if the stomach be found to possess less irritability at any certain period of the day, this period must be selected for taking the principal meal. The practitioner must likewise ascertain whether fluid or solid food agrees best with the stomach, and advise the patient accordingly. The patient should not move about too much, and, sometimes, rest in the horizontal position will be absolutely required. Gastritis, indigestible food, constipation, certain odors, etc., may likewise give rise to, or increase the severity of vomiting during uterogestation, all of which should be borne in mind during treatment, that, if present as existing causes, they may be removed.

Where vomiting occurs only during the early part of the day, Prof. Meigs recommends a cup of coffee with toast, to be taken by the patient while in bed, after which she should, if possible, sleep again for a short time; upon subsequently arising no nausea or vomiting will take place. I have tested this method, and found it to succeed admirably in the majority of cases. Hot milk, or hot water, will prove serviceable when preferred to coffee.

In some cases recently seen in consultation with other physicians, where the usual remedies had been tested, I relieved vomiting by local applications to the neck of the pregnant womb. A solution of cocaine—two grains to the fluid drachm of water—I believe to be the best local agent. The patient can wet a piece of lint with the solution, and carry it to the os uteri every six to eight hours. The fluid extract of *Veratrum viride*, incorporated with vaseline and applied to the os uteri, will, it is claimed, produce about the same effect as cocaine. The local use of Tinct. Iodine, and the application to the cervix uteri of colorless Iodine, have given very satisfactory results. The practice of dilating the neck of the uterus has many able advocates. The cervix is to be dilated to the depth of near a half inch.

Good results have followed in several cases, in which the cervix was dilated by means of a small silk sponge saturated with the cocaine solution.

The vomiting that occurs after the fourth month of pregnancy is supposed to be owing to the pressure of the gravid uterus upon the stomach, and is often very difficult to relieve; indeed, palliation, as the rule, is all that can be expected. Tonics, and antispasmodics may be employed in these cases. I have frequently met with cases which resisted all treatment, ceasing only at parturition; and again, I have

considerably mitigated the severity of this distressing symptom, by keeping the bowels in a regular condition preventing constipation, and administering the small dose of macrotys; relieving the irritable stomach to such an extent, within a short time, as to retain light food. The application of coacine becomes valuable, and more often called for in sickness occurring after the fourth month, than before that time; and should be remembered as an agent soothing and kindly in its action; often relieving when internal remedies are not tolerated. Counter-irritation over the last dorsal vertebræ is often a valuable adjunct to the treatment. In this form of vomiting, all food, or whatever is received into the stomach is generally rejected, and the patient suffers from inanition; indeed, the principal subject of fear is, that she may die from actual starvation. It should be our aim to discover what variety of food best agrees with the stomach, and the period of the day in which this organ is the least irritable, that advantage may be taken of that period for taking a light meal. In some instances where vomiting followed the reception of everything taken into the stomach even in moderate quantity, I have succeeded in sustaining the powers of the patient up to the period of parturition, by giving half-teaspoonful, or teaspoonful doses of milk, cream, gruel, etc., every hour or two throughout the day, occasionally with a few drops of Brandy, or other stimulant added. In one case, ice cream was all in the way of food that could be taken for a number of days, and proved very serviceable in tiding the patient along until more substantial nourishment could be taken. In extreme cases, where all forms of food are ejected by the stomach, rectal alimentation may become necessary. The whites of two eggs, in eight ounces of water, may be injected every six or eight hours. In these cases, the less medicine the patient swallows, the better will it be for her, except when imperiously demanded.

Frequently the vomiting becomes so excessive as to threaten the life of the patient, as before observed, from starvation; for it is seldom the case that abortion is produced by puerperal nausea, though it frequently ensues from emetics. In such instances, after a fair and patient, but fruitless trial of all remedies to overcome the difficulty, and sustain the patient's strength, we may be compelled to resort to premature delivery. This, however, is not to be thought of, unless the patient's life is actually endangered, and should never be undertaken without having first consulted with one or more medical men. Dubois, who in the course of thirteen years met with twenty fatal

cases, advises never to perform the operation, even though the vomiting be violent, when the patient, however feeble and emaciated she may be, is not obliged to retain her bed, when a small portion of aliment can be retained, and when intense and continuous febrile action has not been induced; he also prohibits the operation when signs of extreme exhaustion are present, as loss of vision, cephalalgia coma, somnolence, and mental disorder. A timely interference is advised, at a period characterized by an incessant vomiting, whereby all food, and sometimes even a drop of water is rejected; where emaciation and debility are present, requiring absolute rest; where the least movement or mental emotion causes syncope; where the features become decidedly changed; where there is severe and continuous febrile action, with excessive and penetrating acidity of the breath, and a failure of all other means. Dr. Churchill considers the pulse to be the best guide; and when this rises there should be no hesitation in at once producing an abortion, lest the patient may become so far prostrated, from a delay, as to render death certain.

When vomiting has been very distressing during labor, I have frequently given prompt relief by the administration of the tincture of Gelsemium, and would suggest its employment in these obstinate vomitings during pregnancy.

Ptyalism or *salivation*, frequently occurs during the early months of gestation, and seldom requires any treatment. Rarely, however, it becomes very severe, resembling mercurial ptyalism, but differing from this in the absence of tenderness of the gums and disagreeable fetor of the breath; the fluid secreted is colorless and transparent, or tenacious and frothy, with an unpleasant taste, commonly accompanied with acidity, and often inducing vomiting. As a general rule, this symptom, needs no treatment. *Phytolacca* or *Hamamelis*, however, should be thought of when treatment becomes necessary; a good plan is, to regulate the action of the bowels by mild aperients, and wash or gargle the mouth and throat with Borax water. I have never had this symptom to contend with, excepting in one case. I succeeded in relieving it, after several agents had failed, by the administration of Sulphate of Atropia, hypodermically, the one-hundredth of a grain once a day, until relieved. In cases of acidity, Lime-water may be used with some advantage. The secretion, when profuse, may be moderated, by constantly holding in the mouth some candied Sugar, or a lump of Gum Arabic.

Anorexia, or a want of appetite, and a dislike for ordinary aliments, are symptoms frequently met with at various stages of utero-gestation. These may be owing to the sympathetic actions existing between the uterus and digestive organs, to a torpid state of the organs subservient to digestion, or to an unloaded condition of the alimentary canal. Usually, puerperal anorexia requires but little attention; but where treatment is required, it must be based upon the supposed cause of it—thus, if it be suspected as a result of nervous sympathy, *Pulsatilla* or *Macrotys* will generally remove it; if it originates from torpor of the digestive apparatus, *Nux Vomica*, or the compound tonic mixture will be found useful; and if it be induced by plethora, or an accumulation of morbid matter in the alimentary canal, *Ignatia* may be used or the first decimal trituration of *Podophyllin*, in two or three grain doses; or if persistent, mild purgatives will be essential. Indeed, I would remark here, that throughout the whole period of utero-gestation, if the bowels be kept in a soluble condition by mild aperients, or by the use of proper food, many of the distressing symptoms common to this period will be avoided. Flatulence may be removed by the use of *Sp. Tr. Viburnum*, or by compound spirits of *Lavender* given in some sweetened water. To overcome these difficulties, some authors recommend emetics, but I am decidedly opposed to their use: firstly, because milder measures will accomplish all that can be desired; and secondly, because emetics have a tendency to produce abortion, and which may be avoided by other efficient and less hazardous means. There are some practitioners who proceed, apparently, as if they supposed every patient's stomach to be a strong metallic vessel, capable of being acted upon by emetics, powerful stimulants, drastic purgatives, etc., etc., without the least injury whatever, but always with benefit; such physicians, of all men, are the least adapted to obstetric practice, and I might add truly, or any other.

Either with or without anorexia, the patient may have "longings," or a desire for certain articles, which are sometimes unnatural and even disgusting. When these longings are not directed to unwholesome or dangerous articles, there is no reason why they should not be indulged; neither is there any necessity for interfering with any particular dislikes which may have been produced in the patient's mind. In relation to these longings, and their influence upon the fetus in utero, when ungratified, as well as to the effects of the maternal mind, generally, upon it, there is much discordance of opinion among medical men, some believing that the embryo is acted upon by strong mental

emotions of the mother, while others deride the idea. I must confess, that too much evidence, of a direct and satisfactory character, has been at various times presented to me, to permit me for a moment to doubt this point; and I am thoroughly convinced, that the fetus in utero is subject to influences and changes, resulting entirely from the mind of its mother, when under strong or continuous action. How, or why this is produced, is as difficult for me to explain, as it would be to account for the cessation of a severe labor-pain on the entrance of the accoucheur into the puerperal room, or the sudden dissipation of toothache upon obtaining a sight of the forceps, or to explain why one man should be actively purged upon seeing another swallow a nauseous dose of medicine. I know, "sympathy," and "imagination" are held up as replies—but if these are applicable to the latter cases, why not to the former? A greater attention to the efforts of nature, as witnessed in the human system, and less attention to speculative hypothesis and dogmatic authority, would tend much to advance the true science of medicine. He who really desires a knowledge of the truth, will not hesitate to receive it from any source.

There is no direct vascular communication between the mother and the fetus, nor have physiologists been able to detect any nervous connection between them, and, for this reason, some have denied the mental influence of the mother upon the fetus in utero, and consider the supposed effects of this influence as mere coincidences, and not proofs. And yet, it appears to me, these coincidences, as they are termed, have been too numerous, and often too prominently marked, to admit of any doubt. It certainly appears to have been believed, acted upon, and with successful results, in ancient times (Genesis, chapter xxx, verses 30 to 41). It has heretofore been referred to, that, notwithstanding the absence of direct vascular communication, the fetus has been acted upon by medicine taken by the mother. Nerves or their congeners appear to be necessary to animal life and development, and yet how many most perfectly and astonishingly made living creatures are there in whom not a trace of nerve-tissue has been discovered!

Diarrhea may occur, and usually yields to the ordinary treatment for this disease when independent of pregnancy. It may be owing to intestinal irritation, which may be the result of constipation preceding pregnancy, or it may be induced by the sympathy existing between the intestines and the excited uterus; under either of these circum-

stances, the early administration of Aconite and Ipecac, in the usual small dose, will, as a rule, give prompt relief. Epilobium is Prof. Scudder's remedy. In some instances, the small dose of the first decimal trituration of Podophyllin will be the remedy; the base of the tongue showing a dirty coat is the indication. And again, I have found Sulphate of Quinia with essence of Cinnamon to be decidedly beneficial. When the diarrhea depends upon chronic inflammation of the mucous membrane of the intestines, it becomes of a serious character, and unless treated promptly and properly, may terminate fatally. In this case, Euphorbia, given in doses of from one to ten drops, will relieve the irritation and promote functional activity — hot fomentations should be applied over the abdomen, and mustard to the dorsal and lumbar portions of the vertebral column. The soluble Citrate of Bismuth (Liquor Bismuth) is a very good agent in overcoming diarrhea; one grain to a dram of water is the dose. In addition to these, the ordinary treatment for inflammation of a similar character must be pursued, meeting the symptoms as they present themselves. Much benefit will be derived in these cases by the alternate use of tincture of Aconite, and tincture of Ipecacuanha, in small doses, and in most cases no other treatment will be called for. The diet should be light, and small in quantity, consisting principally of boiled Milk, boiled Rice, Arrowroot, etc. Diarrhea more often occasions abortion than does constipation, in consequence of tenesmus, and which usually occurs about the third month. As with all other affections during pregnancy, care must be taken to avoid active or powerful catharsis, whatever may be the agents employed in their treatment.

Heartburn, or cardialgia, is a distressing symptom, and may be present during the early period of conception, not until the third or fourth month, or may be entirely absent. It may be occasioned by sympathetic action, by the use of certain articles of diet, and by the presence of bile in the stomach, but most generally it arises from acidity of the stomach; it is also said to be caused by emotions of the mind, and an affection of the eighth pair of nerves. There is heat or a burning sensation in the epigastric region, which extends upward along the esophagus, with pyrosis or eructations of a clear, bilious, sour and bitter fluid, and is frequently accompanied with a peculiar sensation of dragging from the stomach toward the spine; eating aggravates the difficulty. There is generally no febrile or other constitutional disturbance present; the appetite is commonly impaired. This symptom

may usually be mitigated by an attention to the bowels, removing acidity by alkalies in aromatic infusion, by a rigid attention to diet, which should be light, nourishing, and easy of digestion, and by the use of moderate exercise in the open air. In very painful and obstinate cases, counter-irritation, as sinapisms, etc., applied to the epigastrium will be productive of benefit. A long-continued use of alkalies will injure the tone of the stomach. Sometimes alkalies will fail to produce the slightest relief; in such cases a resort to acids will often effect the desired result; solution of Citric acid, Tartaric acid, or Lemon-juice may be used, or elixir of Vitriol. As soon as some relief has been afforded, an attempt may be made to invigorate the powers of the stomach, for which purpose I have met with much benefit from very small doses of Pulv. Hydrastis Can. and Capsicum, administered three times a day, near meal times. Nux Vomica and Ipecac are good agents to tone the stomach. Generally females obtain a temporary relief from this symptom, when not obstinately severe, by taking Lime-water, or chewing Magnesia, Chalk, or Peach-kernels.

Gastrodynia, spasm or cramp of the stomach, is frequently the result of some error in diet, but may also be occasioned by cold or violent mental emotions. Its attacks are often sudden, more transient than heartburn, but far more severe. Violent pains of a neuralgic character dart from the sternum through to the back or shoulders, being accompanied with great distension, flatulence, restlessness and anxiety; it may be so severe as to occasion premature labor, or the death of the fetus. The treatment should be prompt and energetic; warm fomentations, or sinapisms, should be applied to the epigastrium. Colocynth is a good agent where the pain is severe, or Viburnum where cramps are present. In some instances of a severe and obstinate character, I have succeeded in giving relief with the compound tincture of Lobelia and Capsicum, also with the tincture of Gelsemium. When the attacks are frequent, they may be overcome by keeping the bowels regular, neutralizing acidity of the stomach, and administering small doses of Nux Vomica several times a day. The diet should be light and nutritious, avoiding fats, acids, and stimulants. Alkalies, aromatics, and anti-spasmodics, are the only internal remedial agents generally required.

Constipation is a common attendant of pregnancy, and is frequently very obstinate and troublesome. It is caused by the compression of

the gradually-developed uterus upon the rectum, which diminishes its diameter, as well as impairs its activity; constipation may also be owing to digestive derangements, improper food, sedentary living, and other causes calculated to lessen the energy of the intestines. Various symptoms depend upon this condition of the bowels, as headache, or a sense of fullness and weight in the head, sleeplessness, irritability, pains in the abdomen, bloody mucous discharges, nausea, and, in the latter period of pregnancy, false pains. Sometimes, notwithstanding accumulation of fecal matter in the intestines, there will be small discharges of a liquid character. Constipation is a symptom always to be dreaded in the pregnant female, because of its liability to produce abortion from the large amount of feces collected in the rectum, requiring great expulsive effort to remove, as well as its tendency, at the time of parturition, to cause protracted labor, peritonitis, or convulsions. Piles are usually a consequence of constipation in the pregnant female. In the treatment of costiveness during pregnancy, especially when dependent upon impaction of the lower bowel, or pressure of the growing uterus, I prefer the use of warm laxative enemas to active purgatives administered by the mouth, and for this purpose an emulsion of Castor Oil, may be used daily, and after the rectal accumulation has been removed, a daily enema of warm water may be substituted for the previous one. If it be possible, it is always decidedly better to overcome constipation by hygienic than by therapeutical measures, which always occasion more or less debility, or else some digestive derangement. If medicine is required, and the tongue is broad and pallid, with a white coating, indicating an alkali, I prefer small doses of Bicarbonate of Potassa or Soda, to any other agent with which I am acquainted. Tincture of Nux Vomica, given alternately with Tincture of Belladonna, or Pulsatilla, in very small doses, has proved serviceable in cases where the constipation was due to lack of nervous energy. Podophyllin is often called for in these cases, and may be given, either in the form of the small pill or the trituration, one part of Podophyllin to one hundred parts of sugar of milk. Active cathartics are seldom required, and should always be used with great care during pregnancy, on account of their tendency to produce premature labor; the secret of success consists entirely in maintaining one daily alvine evacuation. I have recently tested Glycerine Suppositories, with very satisfactory results, in constipation; the action is prompt, and the effect pleasant. In diarrhea, the practitioner should always ascertain if it was preceded by constipation,

and should this be the case, laxative measures must be the first adopted. No female should be allowed by a physician to enter the parturient state with constipated bowels; and in those instances where the practitioner attends the patient previous to full term, he is highly reprehensible if he neglects the proper attention to this condition. The diet in these cases may be such as to assist very much in bringing about the desired regularity, without the aid of physic, as brown bread, mush and maple syrup, hasty pudding, oatmeal, figs, stewed prunes, dates, ripe fruits, and dried laxative fruits stewed, as apples, peaches, plums, etc. Any irritability of the bowels which may follow a removal of constipation can be allayed by some gentle sedative, as Aconite and Ipecac or Sp. Tr. of Amygdalus Per.

Headache, or cephalalgia, is of very common occurrence during pregnancy, and attacks all temperaments, and as it is frequently a premonitory symptom of convulsions or mania, the practitioner should not fail to devote especial attention to its removal. The pain may be constant or periodical, acute or dull, and may be located in one particular part of the head, or over the whole of it. Sometimes, especially when acute, it is also of a throbbing character, and not unfrequently there is an intolerance of light and sound. Usually it is owing to some deranged condition of the digestive organs, and may be readily removed by proper attention to diet, and prescribing such agents as are specifically indicated. If characterized by periodicity, Quinia, or Arsenicum, is the remedy. If pain is localized, think of Rhus Tox. or Bryonia, and if the pain is throbbing, Belladonna. It may, likewise, originate from mental emotions, fatigue, stimulants, and coitus, requiring special sedatives, and quiet, with proper hygienic measures; if anemia exist, some preparation of iron is necessary. I prefer the Acid Solution of Iron, and suggest its use in this condition; if albuminaria be present, treat as hereafter directed. The headache which occurs during the early months of utero-gestation is of a nervous character, and is not regarded as a dangerous symptom; while that which occurs during the latter months is owing to plethora, is usually attended by evident signs of cerebral congestion, and must be treated promptly and energetically, that serious results may not ensue. This latter form, unlike the former, instead of being relieved by the recumbent position is more or less aggravated by it, and is frequently accompanied with a quick, full, strong pulse, flushed countenance, suffused or heavy eyes, heaviness of the lids, and pho-

tobia; the carotids pulsate with unusual force and a sensation of giddiness is present, which is increased on stooping. Belladonna is the remedy for this condition. If this form of headache is permitted to continue without relief it will almost assuredly terminate in convulsions, more especially if albuminous urine be present.

The *nervous* form of headache may be removed, as before observed, by regulating the bowels, and attending to the diet. I have derived considerable advantage from Rhus Tox., Gelsemium, Ammonia Carb., and Bryonia, either separately or in such combinations as indications direct, and, in some severe instances, counter-irritation to the sub-occipital region, or behind the ear. This annoying symptom may occasionally prove quite persistent, and after several days Pulsatilla may become the indicated remedy, the patient showing symptoms of fear. The administration of this agent at such times, will promptly overcome the trouble.

The *plethoric* variety requires somewhat different treatment; the bowels must be kept entirely free from any disposition to constipation, counter-irritation must be intermittingly applied to the whole length of the spinal column, and active diuretics may be safely and freely given. Tincture of Nux Vomica, or tincture of Belladonna, in small doses, will frequently remove the headache. If the urine contains albumen, the means hereafter named must be promptly resorted to. In very severe cases cupping may be applied to the temples, or nape of the neck. Moderate diaphoresis will likewise be found serviceable, and should be effected by the use of the simple diaphoretics, without the administration of any preparation of opium. Although local depletion may act as a beneficial palliatory measure, yet general bleeding, which is so frequently resorted to and recommended by certain physicians and authors, must be specially guarded against, as it debilitates the female, rendering her liable to premature delivery, tedious labor, perhaps requiring instrumental aid or hemorrhage after parturition, and frequently tends to the destruction of the fetus.

Convulsions often attend the condition of pregnancy; their most usual periods of attack are in the latter months, during parturition, or shortly after delivery. Those convulsions attended with or preceded by signs of general plethora, and cerebro-spinal congestion, and commonly termed "puerperal convulsions," will be treated of in another part of the work. At the present time, I would call attention to a form of convulsions, which I have met with as early as at the

second month of gestation, and which occurs much more frequently than the true puerperal convulsions. They most generally occur in anæmic or hysterical patients, or in those whose nervous systems have been exhausted by any depressing cause, and though when the attacks are light no bad results follow, yet they frequently occasion premature labor, or, by appearing at the parturient period, perplex, embarrass, and, perhaps, alarm the practitioner. They are, undoubtedly, of an hysterical character, and differ from the true puerperal convulsions, in being often preceded or attended by the globus hystericus and borborygmus, with a small, hard pulse peculiar to ordinary hysterical attacks; the motions of the limbs are likewise more violent, the eyes roll or stare with a wild expression, and though they may be unnaturally brilliant, yet there will be no suffusion, and the pupil is not insensible. Occasionally the ordinary concomitants of sobbing, crying, or screaming will take place. Urine, of a pale color, is frequently voided in large quantities. In the treatment of this form of convulsion the greatest reliance was formerly placed on the officinal compound tincture of Lobelia and Capsicum (*Antispasmodic tincture*), in doses of from a fluid drachm to half a fluid ounce, and repeated every ten or twenty minutes, until the attack was overcome. This compound is probably one of our most powerful antispasmodics; but owing to its disagreeable taste, together with the large dose required, it is not so generally used as heretofore. Gelsemium is now used quite extensively in these cases, and in small doses frequently repeated will prove quite efficient. Bromide of Ammonium is also a good agent, and may be used either singly or in combination with Gelsemium. In obstinate cases, Chloroform should be inhaled by the patient until spasmodic action is overcome and complete relaxation produced. In the meantime, during the absence of these convulsions, the patient must be placed upon a generous diet of an easily digestible character; the bowels must be kept regular, wine or ale may be allowed, with some chalybeate preparation, the use of which should be continued during the whole course of utero-gestation, unless otherwise contra-indicated; all exciting influences should be removed as much as possible, quiet should be enjoined, excessive depletion by diaphoresis, diuresis, or catharsis are to be avoided, and coitus must be absolutely prohibited. In these instances, I commonly leave some such agents as above named with the patient, to be administered by her friends whenever an attack occurs, and which effects its influence without the necessity of my presence on every occasion. With this class of patients, the

practitioner should always be prepared to meet this symptom as a complication at the period of parturition, for it not uncommonly happens that one or several attacks come on during the labor, as well as subsequently. Occurring at this time, Chloroform should be promptly administered, which will usually immediately overcome all convulsive action.

When there is a tendency to epileptic convulsions, more or less giddiness is apt to be present, and the urine will always be found to contain a little albumen. Again, when *albumen* is continuously present in the urine of a pregnant woman, there is always danger to fear from puerperal convulsions, and more especially if this be associated with a plethoric condition. It is, therefore, the positive duty of every obstetrician to examine the urine of his patients from time to time during pregnancy, and especially when œdema of the extremities is present, and also in the latter months, to discover whether it contains albumen, as well as a diminished quantity of urea, and thus enable him to promptly resort to measures for the prevention of a convulsive attack; though it must not be forgotten that puerperal convulsions frequently come on without any previous albuminous condition of the urine. Headache, dimness of vision, giddiness, are apt to be present, and, sometimes even amaurosis, when albumen exists; and this condition is often accompanied with œdema of the extremities and cellular tissue of the body, and appears to be more common with primiparæ than with multiparæ. It has been attributed to pressure of the gravid uterus upon the kidneys, and likewise, with much greater probability, to sympathetic irritation of these organs. There is no doubt that not only albuminaria, but often even true kidney disease, follow the renal congestion kept up by the pregnant condition. In cases of albuminous urine it will be found useful to produce derivative action by hot or stimulating local applications, dry cupping or even cupping with scarification over the loins and renal region; and even active catharsis. We should, however, be extremely careful that the bowels are not acted on to such an extent as to produce exhaustion, or that an irritation of the intestinal mucous membrane is not excited that will prevent proper digestion. The Spirit-vapor Bath is very useful in all cases. The internal remedies will depend entirely upon the general conditions and surrounding circumstances of the patient; we would think of *Macrotys*, *Rhus Tox*, *Bryonia*, *Gelsemium*, *Eryngium*, or *Belladonna*, as indicated. In some cases we find the urine alkaline, and we supply the acids, Nitric acid being specially indicated. Again there are cases in

which it is decidedly acid, and Bicarbonate of Soda becomes the indicated remedy. Digitalis, Tannin, Benzoic acid, Citric acid, Gallic acid, etc., have each, been found advantageous when administered under the proper circumstances. When there is a deficient oxygenization of the blood, Nitric acid, Nitrate of Ammonia, Peroxide of Iron, etc., are indicated. And after the albumen has diminished, with an increase of urica and urine, blood restoratives as, the Acid Solution of Iron, Citrate, Pyrophosphate, or Carbonate of Iron, with or without Quinia or other tonics, must be administered, together with a nutritious, digestible diet.

According to Andral and Gavarret, the fibrin of the blood is diminished during the first six months of pregnancy, but subsequently becomes augmented, even to a considerable amount above the usual physiological portion, assuming the characteristics of inflammatory blood, and manifesting the buffy coat after venesection. In addition to which, the quantity of the blood is also considerably increased beyond the usual normal proportion. These changes in the blood are, very probably, due to an increased nutrition, by which chyle is formed in greater abundance from the food, and conveyed to the blood-vessels. This plethoric condition is a natural and salutary consequence of pregnancy, and under ordinary circumstances requires but little attention, further than active exercise and moderate diet. But occasionally these additions to the quantity and quality of the blood become so great as to develop symptoms demanding prompt therapeutic treatment, which is more especially the case with indolent females, those who live luxuriously, and those of sanguine habit; it may also be induced by constipation. These symptoms are headache, somnolence, flushed face, vertigo, dyspnœa, full and frequent pulse, heat of the skin, depressed spirits, and high-colored urine. Sometimes the general plethora gives rise to local plethora, which may be followed by congestion of a serious character in the brain, lungs, or uterus. This latter organ, during pregnancy, is the most liable to hyperæmia, which may be known by a sensation of fullness and weight in the pelvis, groins, and thighs, tension or swelling of the abdomen, pain in the kidneys or loins and even symptoms of premature labor; and, not unfrequently, this condition of the mother exerts an influence on the fetus, in consequence of which, its movements become less frequent and weaker, or perhaps cease altogether, but which, if not allowed to proceed too far before giving relief, will again appear with the removal of the local plethora.

Whenever the symptoms of general or local *plethora* become so severe as to require remedial measures, and no symptoms of approaching miscarriage have been manifested, it will frequently, but not always, be advisable to commence the treatment with a cathartic, followed by diuretics, which will be found to exert a safer and more salutary depletory influence, than even general bleedings, which are so highly recommended by many medical writers. Infusion of Digitalis, Sp. Tr. Apis Mel. Asclepias, and Gelsemium will be found quite useful agents in diminishing the plethoric condition. The hot water bath, and drying with a rough towel, will favor general depletion by stimulating the action of the skin. Counter-irritation by dry cupping, sinapisms, or other means should be applied to the upper portion of the spine; the legs and arms may be rubbed or bathed with some stimulating liquid, and, very frequently the wet sheet, or rather bandage applied around the abdomen and pelvic region will effect much benefit; if the case be very severe, tending to a miscarriage, cupping may be pursued, applying the cups to the loins and over the sacrum. On no account must large or small general bleedings be had [except when the urine is found to be excessively albuminous, endangering an attack of convulsions, in which case cupping upon the loins may tend to preserve from such attack], for though they may occasionally be followed by present relief, yet their after consequences are much to be dreaded; beside it is a well-established fact at this day, that bleeding rather increases than diminishes the tendency to an inflammatory condition of the blood. After the symptoms have been removed by the above treatment, the subsequent measures should be light diet, moderate exercise, regularity of the bowels, and use of Macrotys, or the Parturient Balm, which will be found a most excellent agent at this time, with an occasional use of diuretics, and the use of a bandage or proper support to the uterus, if necessary. *Hemorrhage*, or symptoms of miscarriage, are to be treated as laid down elsewhere for these difficulties.

I should observe here, that local congestion of the uterus, or of any other organ is not necessarily connected with general plethora, but may exist with a state of general anæmia; under which circumstances, the nervous and vascular systems will be found in an extremely excitable condition. In such cases, after the removal of the local hyperæmia, proper attention should be bestowed upon the existing anæmia.

Odontalgia, or *toothache* [facial neuralgia], is frequently a troublesome symptom with pregnant women; it may occur with or without

caries, and may appear at any period of utero-gestation, often continuing until parturition; the pain is most usually intermittent, but is occasionally continuous. Generally, it is owing to increased irritability of the nervous system, and at times to a sanguineous congestion of the jaw. As the extraction of a tooth during pregnancy is frequently followed by premature labor, it is not prudent to resort to this expedient, even should caries be present; and it seldom happens that any alleviation of the suffering follows the operation. However, should the pain be owing to a carious tooth, the patient suffering severely without any relief being afforded, and other means have failed, then the tooth may be extracted by a skillful dentist, and probably the administration of Chloroform would entirely prevent any bad influence upon the generative system from the shock of the operation. The proper treatment in these cases is the administration of Aconite, Veratrum, Rhus, Macrotys, or Viburnum, as they may be severally indicated. Where the pains occur periodically, Sulphate of Quinia should be given; the bowels should be kept in a regular condition by gentle laxatives; and as a local application, washing the mouth frequently with cold or tepid water and salt will be found useful. In very severe and obstinate cases, counter-irritation behind the ears will be followed by excellent results, as a sinapism, or stimulating liniments. Tincture of Aconite root, employed in friction beneath the ear, is said to be a very effectual remedy, and is certainly deserving a trial in this distressing complaint. Chloroform applied locally, either alone, or in combination with equal parts of tinctures of Camphor, Aconite root, and Opium, has likewise proved efficacious. If caries be present, the cavity should be cleansed, and the following mixture applied on cotton or lint, and frequently repeated until relief is obtained, viz.: Take of Oils of Cajeput, Cloves, and Amber, each one fluid drachm, Camphor one drachm, rub the Camphor with the oils until it is dissolved. Or, Chloroform may be applied similarly. In the toothache of pregnancy, the breath is very apt to be acid, and will redden litmus; frequently, when constipation is a concomitant, its removal will be followed by a cessation of the pain.

It is frequently the case that the nervous excitement produced in the uterus by the condition of pregnancy extends to the kidneys and ureters, giving rise to spasmodic action of the ureters, attended with severe pain along their course, and occasionally strangury, and which, if not promptly relieved, may induce premature labor. In these in-

stances counter-irritation should be applied over the lumbar region, and sedatives administered internally. The tincture of Gelsemium alone, or combined with the tincture of Macrotys, will prove a very useful remedy. Where strangury is present, Gelsemium and Lobelia will prove valuable agents as relaxants. The inhalation of Chloroform may be necessary in some cases. The hot hip-bath will be found a soothing means of relief in this complication. Constipation is usually present, and may be overcome by copious warm enemata.

The bladder may likewise become the seat of sympathetic nervous excitement, especially the urethra and neck, giving rise to a constant sensation or desire of urinating, and the urine passes in small quantities, frequently with pain and difficulty, and is likewise, with some patients, attended with excessive irritability of the external generative organs, and more or less severe and distressing itching, which is increased at night. The internal use of Aconite, Gelsemium, Rhus, Apis and Eryngium are the remedies usually indicated; hot applications over the region of the bladder may also be used as an additional means of relief; sometimes, liquor Potassa may be advantageously administered with other means. The bowels should be kept regular, and the diet should be of a mild, not stimulating, character. In all troublesome or obstinate cases the urine should be examined, and if an excess of uric acid, urea, or phosphates, etc., be discovered, the proper treatment therefor must be pursued. For the itching of the genitals, cold applications should be employed, and the parts kept well cleansed. (See *Pruritus of the Vulva*.)

Occasionally, from pressure, or perhaps from an increased determination of blood to the uterus, which withdraws this fluid from the immediate neighboring parts, there will be found a torpor of the bladder, giving rise to a retention of urine and its difficult passage. This is a more serious difficulty than the previous one, on account of its tendency to produce retroversion of the uterus. Eupatorium Pur will favor an increased flow of urine; Apis in some cases will prove effectual. Santonin, in two or three grain doses, exerts a specific action, by stimulating contractions of the bladder. Acetate of Potassa should also be thought of; the patient should be advised to empty the bladder often, if possible, by her own efforts, and should these means fail, the urine must be removed by the careful introduction of a catheter; this operation must not be delayed for too long a period.

Syncope, or *fits of fainting*, frequently attend the pregnant condition, and may occur at any period from conception to parturition, though more commonly during the earlier months; vertigo, or dimness of sight, is also apt to be present, with sometimes tinnitus, and weakness of the knees. These affections may be owing to debility from whatever cause, to extreme nervous susceptibility, or to plethora. Syncope generally occurs while the patient is standing, is seldom of long duration, and very seldom causes any serious results. However, when frequently repeated it may induce premature labor, which should be carefully guarded against. The treatment should be that usually pursued in syncope at other times; put the patient in a recumbent position, in a place where there is a circulation of cool air—dash cold water on the face—apply Ammonia, Ether, or Vinegar, etc., to the nose, and after her recovery, should there be much debility, with coolness of the surface, diffusible stimuli may be administered internally, with frictions to the limbs, and, in severe cases, along the spinal column. When the attacks are severe, and occur frequently, Pulsatilla, Gelsemium, Digitalis, and in some cases, Bromide of Ammonium may be given with benefit. The food should be wholesome, and restricted somewhat as to quantity, and if the patient be weak, tonics may also be employed. When these attacks are frequent, Sulphate of Quinia, or Strychnia will be efficacious; if anemia be present, the Acid Solution of Iron.

Palpitation of the heart is not an unusual occurrence, during pregnancy; it is a distressing symptom, and though by no means dangerous, it occasions much alarm to the patient. It may happen at any period of utero-gestation, and may be owing to mental excitement, derangement of the digestive organs, pressure, flatulency, or sympathetic nervous irritation. During its presence, it may be relieved by the administration of an alkali, if acidity and flatulency are present; by a mild laxative if the bowels are confined; and under other circumstances, Digitalis, Lobelia, Cactus, Strophanthus, and in some cases stimulants may be employed, according to indications. Four to eight drops of the Sp. Tr. of Digitalis, given daily for some time after a paroxysm subsides, may prevent a return of the same. During the interval, some of the bitter tonics may be administered, and will often be found beneficial in preventing a return of the palpitation, and should the patient be of an anæmic habit, the proper chalybeates must be used in conjunction. The diet must be mild and stimulating,

the patient should exercise moderately, her dress should be loose, coitus should be abstained from entirely, and the mind should be kept perfectly tranquil.

Dyspnœa, or *difficulty of breathing*, may occur, in the early months, from sympathy, and at a later period from plethora, or from pressure of the enlarged uterus; it may likewise be owing to derangement of the digestive organs, thoracic disease, cardiac disease, tumors, etc. The treatment will consist in the administration of antispasmodics, as *Gelsemium*, *Lobelia*, *Ether Carbonate of Ammonia*, etc., attention to the regularity of the bowels, and a course similar to that just named for palpitation. When owing to organic diseases, or congestion of the lungs, these must be attended to according to their indications. When the difficulty is owing to the enlargement of the uterus, but little relief can be expected until the delivery of the fetus, hence, there will be no necessity for injuring the patient's system by the employment of medicines.

Cough sometimes occurs, independent of cold or existing disease, and which, in the earlier months, is owing to sympathetic action; in the latter to pressure. The cough is usually short, dry, hacking, and constant; occasionally very severe, with but little or no expectoration, no febrile symptoms, and no change in the pulse, and is apt to cause premature delivery. It may be treated by narcotics, antispasmodics, rest, and regularity of the bowels, with a proper attention to diet.

In the latter months of pregnancy, when the cough is severe and persistent, *Belladonna*, *Pulsatilla*, *Sanguinaria*, and occasionally an anodyne may be employed. *Drosera*, *Bromide of Potassium*, *Trifolium*, *Bromide of Ammonia*, etc., are advised by Prof. J. M. Scudder. If the cough be due to irritation of the diaphragm and lungs from upward pressure of the enlarged uterus, but little can be done, except to keep the bowels regular, the urinary organs healthy, and during sleep to have the head kept in a somewhat elevated position. The cough will pass away after parturition.

Mastodynia, or a painful and distended condition of the breasts, is very apt to attend pregnancy, especially with primiparæ, and may be owing to the rapid development of these organs and flow of blood to them. When severe, relief is frequently afforded naturally by a thin, colorless, serous discharge from the nipple. To relieve congestion,

and prevent inflammation, which are the principal indications, tepid fomentations may be applied, together with an anodyne liniment, as a mixture of Oil and Laudanum; the bowels must be kept free, and all pressure upon the breasts removed. The Sp. Tr. of *Phytolacca* Dec, will be found exceedingly useful in these cases, in doses of one to two minims, administered in some water, and repeated every three or four hours, at the same time applying it locally. Tincture of *Iris Versicolor* will also prove beneficial in many instances.

Muscular pain about the pelvis and hips, as well as the abdomen, frequently accompany pregnancy; the cause of these pains is supposed to be owing to pressure on the anterior branches of the sacral nerves; but this could only happen when there has been a descent of the uterus, at the termination of utero-gestation, for prior to this period the uterus is too much elevated for its inferior portion to compress these nerves. As these pains are more common after fatigue, they are probably dependent on an irritable condition of the nerves of the painful muscles, and should be treated principally by rest. In severe cases *Macrotys* may be given internally, and stimulating liniments may be rubbed over the affected parts, and the back; and the pain of the abdominal muscles may be frequently relieved by the use of a bandage.

Mania, or insanity, usually attacks pregnant females of a hysterical disposition, or those who are hereditarily predisposed to it. It may occur at any period of utero-gestation, from conception to parturition, and as a general rule, is not so severe as that which occurs in the puerperal state, and ceases with delivery. The treatment must be principally moral, meeting any symptoms which present themselves, according to their indications; employing tonic means, where debility is present; *Pulsatilla*, *Macrotys*, *Stramonium*, and the Bromides, as they may be specifically indicated, where there is much nervous irritability; and the means recommended for plethora, or albuminous urine, should these exist. The application of cold to the head, stimulants to the spine, and cups to the temples or back of the neck, should always be employed, as may be indicated, to overcome any local congestion. When the mania is acute, treat it in the manner recommended for Puerperal Mania, *which see*.

Beside the several affections which have just been named, as owing to nervous sympathy and deranged circulation, there will be found

certain changes in the mental condition of the patient; thus she may become very *despondent*, or very *irritable*. The former, when severe and obstinate, and accompanied with gradual loss of health, may terminate eventually in puerperal mania; the latter has nothing serious in its tendency, and disappears after delivery. The first must be treated by moral as well as therapeutical means; the patient should be kept from all depressing circumstances, should be led into cheerful society, where she will not hear of any wonderful or fatal accidents having occurred to parturient women, and should be exhorted to overcome the tendency to despondency as much as possible; the therapeutical measures should be Pulsatilla, Viburnum, the Compound Tonic Mixture, cold to the head, diuretics, etc., if plethora exist; and chalybeate tonics when an anæmic condition is present.

The second should be treated by the use of Macrotys, keeping the bowels regular, and should wakefulness be present, the following may be administered, Sp. Tr. of Aconite, Sp. Tr. of Hyoscyamus, Sp. Tr. of Gelsemium, etc., as indications direct. The patient should take moderate, but regular exercise daily in the open air, and the diet should be of a non-stimulant and non-heating character.

Pruritus of the Vulva, Prurigo, or itching of the Genitals, occurs during the early months of pregnancy, and is sometimes very distressing; occasionally it continues during the whole period of utero-gestation, and disappears immediately after delivery. It may be caused by uncleanliness, acrid discharges, and frequently, according to Dewees, from aphthous efflorescence of the vulva; at times, it occurs without any known cause. In the treatment of this distressing symptom, means must be employed according to its severity, and the pathological condition of the parts affected. In the greater number of cases a solution of Borax will be found efficient; if much inflammation of the parts is present, a weak solution of the Sesquicarbonate of Potassa, or of Nitrate of Silver may be applied locally, and as it subsides an astringent infusion may be substituted, as of Geranium and Golden Seal; a compress of lint or soft linen should be moistened with these applications, and placed between the labia immediately in contact with the affected parts. A very excellent preparation is composed of Carbolic acid five grains, Acetate of Morphia four grains, Dilute Hydrocyanic acid one fluid drachm, Glycerin two fluid drachms, distilled Water a sufficient quantity to make two fluid ounces of the mixture; moisten some lint with this, and apply it upon the part affected. In

all cases the bowels should be kept regular, and the parts well cleansed. Occasional tepid baths may be employed with benefit, and sometimes the induction of diaphoresis will produce a favorable result. Internally, but little means are required; Rhus Tox, Apis, or Eryngium may be administered, if such agents are desired. If the pruritus presents characters of periodicity, Sulphate of Quinine, Macrotys, or Arsenicum, etc., may be administered, according to the indications present. The Juniper Pomade applied on lint, I have found highly successful in a number of cases; and in others; the disease has disappeared as if by magic, upon the local application of a lotion composed of a saturated aqueous solution of Sulphurous Acid Gas one fluid ounce, and rain-water three fluid ounces. The saturated solution may be made by passing a stream of the gas through water, until this is saturated. Wet a piece of lint or linen with it and apply to the part. One part of Carbolic acid to fifty or sixty parts of water may frequently be locally applied with advantage. If the itching be due to pediculi, Cologne, or the above carbolic preparations, will remove them without any necessity for the use of that filthy and undesirable mercurial ointment.

CHAPTER XXII.

DISEASES OF THE PREGNANT FEMALE—*Continued.*

THE symptoms or affections originating from compression of the enlarged uterus upon neighboring organs are several. *Edema*, or serous infiltration into the cellular tissue of various parts of the body, will be first noticed. It may occur in the early months of pregnancy, but is most common in the latter months, and is generally attributable to pressure of the enlarged uterus upon the blood-vessels of the pelvis, thereby interrupting the circulation, and finally resulting in effusion. It is not, however, always produced from this cause, as frequently the size of the uterus bears no proportion to the extent of the œdema, but is usually small; and, again, we frequently find the uterus enormously distended, either by excess of liquor amnii or plurality of children, without any accompanying œdema. In those instances where the swelling is caused by uterine pressure, it is mostly confined to the lower extremities, but where it spreads over the whole body it is due to plethora,

or renal congestion, which may be known by the presence of albuminaria, and either of which is unfavorable. Convulsions are very apt to succeed œdema from these latter causes. Ordinarily, no pain accompanies this affection, yet, occasionally, it is very painful. Where the swelling is confined to the feet and ankles, quickly disappearing on assuming the recumbent position, but little treatment is required; but where it becomes so great as to render the recumbent position almost impossible, from dyspnœa, or where it is complicated with effusion into any of the important cavities of the body, it becomes of a serious nature, and requires energetic treatment. In the milder cases, when confined to the lower extremities, and where treatment is required, relief may be afforded by the administration of laxatives, with cold applications to the œdematous part, at the same time supporting the limbs with a bandage well applied. The rubber, or elastic, bandage is more efficient in these cases than if made from other material, as the degree of pressure can be regulated, thus producing more uniform support. In severe cases, purgatives and diuretics will be beneficial, and it will often become necessary to induce premature labor as the only means of saving the patient's life, who can not possibly live up to the full period with an increasing infiltration. When œdema is not dependent upon some important organic lesion, it usually disappears after parturition. When renal congestion is a cause of the effusion, in addition to the above treatment cups may be applied over the region of the kidneys, and, if obstinate, a discharge may be maintained from this region by means of an irritating plaster. Puncturing and scarification of the œdematous limbs are advised by some authors, but they should not be attempted, as they are most usually followed by gangrene.

When, by pressure of the enlarged uterus upon the pelvic blood-vessels, the circulation within the lower extremities is obstructed, it gives rise to a *varicose condition of their veins*. This difficulty is a frequent accompaniment of the latter months of utero-gestation, and is more apt to occur in women of an advanced age, than in young females. As they are owing to the impeded circulation in the extremities, their cure can not be effected until the cause is removed, when they usually disappear spontaneously. Sometimes they continue after delivery, gradually increasing, and on each subsequent pregnancy augmenting considerably in size, forming tumors which are more or less painful, embarrassing the movements of the female, and often terminating in

obstinate ulcerations. Rupture of these veins is the principal accident to fear, as it may prove fatal, and the practitioner's treatment should be especially directed to a prevention of its occurrence. The patient should not be long at a time on her feet, but should keep in a horizontal position, with the dress loose, and the employment of properly graduated pressure over the veins by means of bandages, or elastic stockings. The bowels should be kept free, the diet spare, and the bandages may be kept moistened with cooling applications, especially in severe cases. If the varices are situated in the genital parts, as the vulva or vagina, compresses moistened with cooling lotions may be applied, and continued for some time, or until the enlargements disappear, in order to prevent rupture, which sometimes happens, especially at the time of parturition, during the passage of the fetal head through the pelvic canal. Within a year or so, new modes of treating varicose veins have been suggested; one by Dr. Linon, in which he thoroughly moistens a flannel compress with a solution of six drachms of perchloride of iron in eight ounces of water, applies this upon the varicose part, and holds it there for twenty-four hours by means of a roller bandage of flannel applied moderately tight. This application is to be repeated daily for ten or twelve days in succession, or until the varices have disappeared, after which the bandage may be continued for some days without wetting the compress. This is stated to have cured enormous varices, accompanied with pain and dark spots; an improvement in the venous dilatations will be observed from the first application. Dr. Rugge, of Berlin, has met with success by subcutaneous injections of one or two grains of Ergotin, repeated every few days, the varices gradually disappearing from the first injections. Pain and infiltration followed each injection, but were succeeded by no abscess, nor any influence in provoking uterine contractions. The best vehicle is Glycerine, five grains of the Ergotin to one fluid drachm of this fluid. Prof. Scudder prefers the Hamamelis.

From a cause similar to the above, *hemorrhoids*, or *piles*, may be produced, and more particularly if constipation be present. Occasionally they are an attendant of diarrhea. They are similar in nature and appearance to those occurring at other times, and require the same local treatment. When slight, they may be removed by producing regularity of the bowels by means of laxative medicines, with cold and astringent applications to the parts. Although Magnesia, as the

rule, is contra-indicated in pregnancy, on account of its tendency to accumulate in the intestines, the following preparation is stated to be very beneficial in procuring daily soft alvine evacuations without pain: take of Sulphate of Magnesia, Carbonate of Magnesia, Bitartrate of Potassa, Sublimed Sulphur, each, equal parts. The dose is from one to three teaspoonfuls before breakfast, according to its action. Internal agents may be administered, in the hope of overcoming the trouble by stimulating the venous circulation; Hamamelis and Collinsonia may be employed, either singly or in combination, for this purpose, and will oftentimes effect a cure. Owing, however, to the fact of this condition being the direct result of mechanical pressure, therapeutic means do not always relieve; the annoyance and suffering continuing until the cause is removed by parturition. If pain or irritation exist, narcotic ointments, as Poke, Stramonium, etc., may be applied with benefit, and where the tumor protrudes externally the pain and irritation may be relieved by the application of Laudanum, incorporated in Juniper pomade, or Glycerole of Tannin on absorbent cotton. The removal of piles by an operation, during pregnancy, is totally inadmissible and unjustifiable. Nor can a perfect cure be expected until after parturition, when the pressure has been removed by a return of the uterus to its nongravid condition. I have derived considerable benefit, in this difficulty, from an ointment composed of Stramonium ointment, one ounce, Alum, two drachms, Sulphate of Morphia, ten grains; mix, and apply a small quantity on lint or cotton. Another valuable local application is the Persulphate of Iron. A solution of Borax, also, is a cooling application, and will relieve the itching and burning; the parts may be washed with it morning and evening. An ointment composed of Tannin, ten grains, Acetate or Muriate of Morphia, two grains, pure Lard, or Spermaceti ointment, one ounce, has also been advantageously employed as a local application. All these ointments should be applied two or three times a day, and be carried well up into the rectum. Occasionally the pain and irritation become so excessive that the direct application of anodynes will be called for. Cocaine may be employed; a four per cent. solution will usually mitigate the suffering. Many other remedies have been employed in piles with benefit; and others may suggest themselves to the mind of the practitioner, but whatever local means may be used, it is of the greatest importance to keep the bowels regular, the diet spare but nutritious and easily digested, and avoid too much exercise, or even long standing.

Should hemorrhage be present, it must be checked, especially when considerable, or it may occasion miscarriage; for this purpose astringents, cold applications, and compression may be employed. A preparation composed of Stramonium ointment, one ounce, Styptic powder (calcin'd Sulphate of Iron), two drachms, and powdered Alum, one drachm, employed as a local application, and introduced as far as possible into the rectum by means of the finger or otherwise, will be found very valuable in all cases of hemorrhoids accompanied with hemorrhage. Persulphate of Iron, diluted about one-half, and applied on cotton or lint, will also act promptly in controlling the bleeding. Injections of warm water may be used for this purpose, when other means are not at hand. Fluid extract of Witch-hazel bark, taken internally, has also proved very useful.

Prolapsus ani is occasionally met with as a concomitant of piles, or it may occur independently; it is often attended with excessive pain during an alvine evacuation, together with distressing tenesmus, and is usually produced by the same causes which occasion piles, viz.: pressure. This symptom is exceedingly annoying and distressing, and but little can be done toward a cure of it, until after delivery is accomplished, when, as a general thing, the cause being removed, a spontaneous cure is effected.

With this complication, the parts are usually relaxed to the degree, that extrusion of a portion of the mucous membrane of the rectum is produced by the slightest causes. It is quite likely to follow constipation; in some cases every evacuation of the bowels is followed by a return of the difficulty; straining at stool, and coughing are also exciting causes. Temporary relief is all that can be expected in the way of treatment; whenever the prolapsus occurs it should be returned as soon as possible. Place the patient in the knee-elbow position, anoint the fingers before manipulating the parts, and endeavor carefully to return the part first, which escaped last. This is a simple operation, and one the patient can execute after a short time, without professional assistance. If painful, the protrusion can be painted with a solution of Cocaine before an attempt is made to return it, after which the parts may be supported by passing within the anus a pledget of cotton, which may be saturated with Glycerole of Tannin, or other mild non-irritating astringents. The female should be instructed as to the after treatment, in order to properly apply it in subsequent attacks. *Prolapsus ani* is a very troublesome affliction during par-

turition, as every pain is apt to cause a protrusion of the bowel, rendering it irritable and most acutely sensitive.

Cramps of the inferior extremities, sometimes extending as high as the upper pelvic region, are occasioned by pressure of the gravid uterus upon neighboring nerves; they may likewise be occasioned by standing upright for a long time, too much exercise, fatigue, constipation, or extension of ligaments. They are sudden in their attacks, are occasionally very frequent and painful, and mostly occur during the latter months of pregnancy. Friction over the affected part, and change of position will ordinarily remove them; and when they are frequent in their attacks, relief can often be afforded, and this disposition to frequency obviated, by an attention to the bowels, together with the use of *Macrotys*, or *Xanthoxylum*. *Viburnum* will often overcome this trouble, especially if the patient take the recumbent position during its administration, and so remain, quietly, until the paroxysm subsides. The application of a liniment composed of equal parts of *Aq. Ammonium*, *Turpentine* and *Olive oil*, will be found quite serviceable in relieving the spasm of the part. The soreness caused by the cramps may remain for sometime after their cessation, and may be removed by rubbing the parts with some *Camphorated oil*, or the officinal compound tincture of *Camphor*. *Gelsemium* may also be administered with benefit.

The pregnant female frequently suffers from a deep seated *pain in the right side*, which most commonly manifests itself after the fifth month; it is unaccompanied by cough, or any febrile or inflammatory symptoms, and is attributed to the fundus of the uterus pressing against the concave surface of the liver. It is not present until after the ascent of the uterus above the superior strait—never occurs in left lateral, or anterior obliquity of the uterus, but only in right lateral obliquity, and is much relieved, after the eighth month, by the falling or descent of the uterus into the pelvis. Permanent relief can not be had until after delivery, yet when severe, the female may derive considerable benefit from change of position, standing, lying on the left side, stretching upward, and leaning to one side; in addition to which the bowels should be kept free. At least one evacuation should be solicited daily. Regularity in going to stool will often correct any irregularity in this regard. Proper attention to diet, and judicious exercise should be advised. One drop of *Nux* in a glass of water

may be taken each morning, or mild laxatives, if they become necessary. When the pain is excessively severe, cupping will sometimes mitigate it. The diet should be light and non-stimulant.

Jaundice, occasionally occurs during pregnancy, and is owing to pressure upon the gall-ducts by the neighboring viscera, which are compressed by the gravid uterus, in consequence of which there is not a free escape of bile; it is more severe when it happens during the latter months, and is usually attended with dyspeptic symptoms. But little can be done for this evil; though it is proper to regulate the bowels, and attend to the diet. Should it remain after delivery, it must be met with the appropriate treatment.

Females who have given birth to many children are sometimes annoyed with a *lax condition of the abdomen*, in which the abdominal parietes, from their excessive looseness, do not afford support to the enlarged uterus, thereby allowing it to fall in any direction. The best treatment, in such cases, is a local application composed of astringent and slightly-stimulant agents, together with mechanical support by means of an appropriate belt or bandage, and the patient should assume the recumbent position daily, for three or four hours at a time.

In opposition to this, we frequently meet with a very *rigid condition of the abdomen*, in which its parietes do not give way in proportion to the gradual augmentation of the volume of the uterus. This is most common among primiparæ, occasioning much distress, in consequence of the tender and irritable condition of the parts, the skin over which often cracks. This may sometimes be relieved by rubbing Sweet oil, Almond oil, simple ointment, etc., over the part, and if very painful or tender, it may be relieved by hot, or soothing applications, Cloths wrung out of hot water, or a fomentation of Hops. If abrasions exist the parts may be painted with a solution of Cocaine. Internal treatment is useless.

There are other symptoms occasionally met with during pregnancy, which are due to pressure, or nervous and vascular sympathetic derangement, and which deserve a passing notice. Thus, in the latter months of pregnancy, females are unable to retain their urine, which escapes upon the least exertion, and may or may not be accompanied with tenesmus or a frequent desire to evacuate the bladder; this *incon-*

tenence of the urine seldom admits of relief until the removal of the cause—the pressure of the bladder by the enlarged uterus—by delivery; perhaps, some benefit may accrue by giving support to the abdomen. It is a very annoying symptom, but is by no means dangerous.

Occasionally, *pustules* around the genital organs may appear, or vaginal *mucous discharges* of a whitish color, tinged sometimes with green, or blood. These symptoms disappear after delivery, and require no other treatment than cleanliness, frequently bathing and injecting the parts with Fluid Hydrastis, or solution of Borax, or other similar combination. The practitioner must be careful not to injure his patient's reputation as well as his own, by pronouncing either of these as syphilitic, on too slight grounds, for they are often the legitimate results of pregnancy.

Pressure of the uterus is apt to occasion congestion of various organs, especially of the lungs, or stomach, in consequence of which *hemoptysis* or *hematemesis* may result from exudation of blood from the mucous membrane. These hemorrhages may be treated by laxatives, sedatives, astringents, and the means usually employed for them when existing at other times. Should they, at the time of parturition, become excessive, resisting the treatment employed, the delivery should be hastened by artificial means.

There are likewise symptoms which occur during utero-gestation, depending upon an abnormal condition of the uterus, its supports, or its contents. Among the displacements of the organ, *prolapsus* or *descent*, are the most common, and it usually takes place during the first months, before the ascent of the uterus above the superior strait; though it must not be forgotten that, during the early weeks of pregnancy, there exists, probably from an augmentation of the weight of this organ, what may be termed a normal prolapsus; but when it exceeds this normality it then becomes abnormal and demands treatment. The patient will complain of a bearing-down sensation, with pain and uneasiness in the sacral region, and frequently in the lower part of the abdomen. The prolapsus will be more or less perfect according to the capaciousness of the pelvis, and the laxity of the ligaments. Where there is an excess of pelvic dimension, a sudden prolapsus may take place in an advanced stage of pregnancy, from straining, over-exercise, or some unusual exertion. This displacement not only occasions abortion, but is frequently caused by it, from the

uterus being left in an inflamed or hyperæmic condition; it may also be produced by straining, debility, and whatever circumstances would give rise to it in the unimpregnated state. This difficulty may give rise to very serious evils, and should be promptly treated. Ordinarily, the employment of astringent vaginal enema, rest in the recumbent position, the wearing of external supports or bandages, and regularity in the evacuations from the bladder and bowels, will answer the purpose. In very severe and obstinate cases other measures may be required; the rectum and bladder should first be evacuated; the prolapsed organ should then be carefully placed in its proper position, and retained there by a piece of fine sponge introduced into the vagina, and the patient should maintain as much as possible the recumbent position, until the increased volume of the uterus would prevent any further prolapse. The sponge may be moistened with some astringent lotion, if desired, and should be cleansed every two or three days. Any accompanying symptoms, as debility, constipation, etc., must be met by appropriate treatment. If the mechanical treatment, by sponge or other pessary, occasions irritation, increased suffering, or pain, it will have to be omitted, and the preceding measures be pursued. When we find an impaction of the uterus within the pelvis, rendering its reduction impossible, abortion will have to be induced.

Retroversion of the gravid uterus, is sometimes met with, as well as in the unimpregnated organ; in this displacement, the fundus is found backward, at or below the promontory of the sacrum, while the os tinæ is carried forward and upward, either upon, or above the pubic symphysis, and the vagina being dragged along with the os, its anterior wall will be likewise carried forward and upward, while its posterior wall will be considerably depressed. Retroversion of the uterus may come on slowly or suddenly, it seldom exists in the latter months of pregnancy, and usually takes place between the second and fourth months. It may be owing to various causes; a very common one is a retention of urine until the bladder becomes enormously distended, which extending backward and downward, thrusts the uterine fundus along with it in the same direction; or a large pelvis may predispose to this accident, but it is not an essential condition; relaxed condition of the uterine supports, augmented weight of the fundus with relaxation of the parts, great concavity of the sacrum, ovarian enlargement, tumors, violent efforts, straining at stool, blows, falls, vomiting, polypus, hydatids, etc., are each capable of effecting this displacement

under favorable circumstances. The symptoms accompanying retroversion are, a partial or complete retention of urine, which often takes place suddenly; when it is partial there is a desire to urinate frequently, the water passes off in small quantities at a time, but never in sufficient amount to empty the bladder, and finally, it involuntarily dribbles away, and the enormous distension of the bladder creates a chronic inflammation, or what is yet worse, it may become ruptured. Defecation is also very difficult, the feces being flattened and passing in small quantities; and both the dysuria and difficult defecation are increased by any efforts at evacuation. When retention of urine is present in the early months of pregnancy, the practitioner should suspect retroversion, and adopt the proper means to satisfy himself in relation to it. In connection with these two prominent symptoms, there will be an aching pain in the sacrum, thighs, and pubes, with weight in the pelvis and disagreeable bearing-down sensations. When retroversion is suspected in the pregnant female, an examination should be immediately demanded, for if it be not promptly attended to, it may occasion the death of both the mother and child, as may be readily imagined, when an enlarging uterus becomes impacted in the cavity of the pelvis, preventing micturition by its pressure upon the urethra, causing irremediable constipation by compression of the rectum, and intense suffering by pressure upon the anterior sacral foramina and nerves. Upon an examination per vaginam, which must in all cases be made, the uterine fundus will be found depressed below the promontory of the sacrum, with the cervix toward the bladder, and higher than the crown of the pubic arch; in some instances, the os uteri may be found in its normal position, with the fundus depressed, the cervix being bent or flexed at an angle, in which the uterus is shaped somewhat like a retort; this is termed retroflexion, and is not common in the pregnant condition. If this displacement be not relieved, the pains continue to increase, vomiting takes place, with peritonitis, and the patient dies from inflammation or sloughing; and it must be remembered, that the later the gestating period in which the retroversion occurs, the greater is the danger.

In treating a case of this character, before any attempt at reduction is made, the bladder must be emptied by means of a male elastic catheter, bearing in mind that the displaced uterus, having elevated the neck of the bladder, causes an elongation of the urethra. Sometimes considerable difficulty will be experienced in introducing the catheter, which may be overcome by pressing the uterus backward,

and thus liberating the urethra, until the instrument has entered. Soon after the evacuation of the bladder it will often be found that the uterus assumes its normal position without further interference; should this not take place, the rectum must be unloaded by copious injections, as an accumulation of fecal matter within it will very much interfere with the attempt to replace the uterus properly. Though it should be stated that injections have sometimes failed to produce the desired effect, and instead of relieving has aggravated the difficulty. The patient is now to be placed upon her face, or the operation may be performed while she lies on her left side, with the nates near the edge of the bed, and two fingers be passed into the posterior part of the vagina along the curve of the sacrum, until they come in contact with the presenting part of the depressed fundus, which must be pressed cautiously and firmly upward and forward, in the direction of the axis of the superior strait; for if the pressure be made in any other course, no reduction can be accomplished. When the reduction is effected, the womb assumes its position with a sudden jerk, and sometimes a clicking noise. Sometimes this attempt will fail; it will then be proper to introduce one or two fingers into the rectum for the purpose of pushing the fundus upward and forward, while a finger or two of the other hand enters the vagina, for the purpose of bringing down or depressing the cervix, and all these trials should be made steadily, cautiously, and firmly. In very obstinate cases, the patient may be placed on her knees, having the pelvis elevated as high as possible, while the shoulders rest upon the bed, table, or whatever she is placed upon, and in this position, having the aid of gravitation, we may undertake the last named manipulation; this posture is a favorable one, inasmuch as it tends to overcome tenesmus and bearing-down efforts. Various other means have been advised to reduce the retroverted organ as the use of Bond's instrument for retroversion; Gariel's India-rubber pessary, etc., and to produce a thorough muscular relaxation, the use of Chloroform, or Hydrate of Chloral.

Having accomplished reduction, the patient should be kept in a recumbent state, until the ascent of the uterus above the promontory, when its volume has so far augmented as to render any further displacement of the kind impossible; and the bladder should likewise be emptied every four or five hours. If necessary, anodynes or tonics may be given according to the indications. Instances are sometimes met with, in which, after the organ has been reduced, it will not remain so, but falls over again upon the slightest exertion, and the

operation will have to be performed again and again before the reduction will remain permanent. In these cases advantage has ensued from the introduction of a thin gum-elastic air bag, of a fusiform shape, into the rectum; the large end of this to be introduced, after which it is to be distended with air, and constantly worn by the patient, until no longer required; it admits of easy removal at any time by permitting the inclosed air to escape, and then withdrawing it.

The reduction of the uterus may only be partial, so that although remaining in the pelvis, a part ascends, giving the organ a deformed shape, still an attention to the bladder and rectum may enable the patient to reach the full term; in these cases the labor may be completed without artificial aid, though it may be tedious and difficult.

Where retroversion has occurred previous to pregnancy, and the organ is rendered almost immovable by adhesions, or where from other causes, after a persevering attention to the bladder and rectum, no permanent reduction can be obtained, it has been proposed to induce premature labor as the only means of saving life; but we must be cautious in a resort to this expedient, and should never undertake it without the opinion of a second or even third practitioner.

In *anteversion* of the uterus, the displacement is exactly contrary to the last; the fundus pressing forward toward the symphysis pubis, near the level of the superior strait, while the cervix is thrown backward and upward, the os uteri looking toward the hollow of the sacrum. This may originate from severe exertion while the bladder is empty, and is more apt to ensue when the ligaments are in a relaxed condition—from blows, falls, tumors, diarrhea, relaxed abdomen, fecal accumulations, lifting heavy weights, violent exercise, etc. The symptoms are, a constant desire to pass urine, which is accomplished with some difficulty and heat; constipation is frequently present, with pelvic heaviness, hypogastric pain, and a distressing, dragging sensation, which is augmented by standing or walking. It is rarely present during pregnancy, and when it does occur is not so serious as retroversion. The treatment is: after placing the patient on her back, to elevate the fundus and pull down the cervix with a finger, or hook, and afterward, if required, a bandage may be worn, with a compress over the pubes; the bowels should be kept open, but the urine should not be passed too frequently. The woman should remain lying upon her back for several days or weeks, as may be required; though from the debility following a prolonged confinement of this kind, I gen-

erally advise more or less exercise, according to circumstances, the uterus being held in place by a bandage, and proper support for the time being.

An aqueous discharge, of a limpid, or yellow color, sometimes takes place during pregnancy, being variable in quantity, at times passing by drops, and again occurring suddenly and in large amount. It is called *hydrorrhea*, or *false waters*. Usually this is not a serious affection, but occasionally uterine contractions of a severe character accompany it, which, if not overcome, will result in the premature expulsion of the uterine contents. As regards the source from which this fluid originates, we have no satisfactory evidence; authors vary in opinion concerning it, some considering it to be the result of an uterine dropsy, others to a transudation of the amniotic fluid through the membranes, some again to a rupture of the allantois, or rupture of the chorion, and *caduca*, etc. Most generally, the woman goes on to the full term of utero-gestation. Where there is danger of miscarriage, the bowels should be kept in a soluble condition by mild laxatives or injections, the patient should be enjoined to keep in a state of rest in the recumbent position and agents administered to allay any uterine excitement, among which I prefer the compound powder of *Ipecacuanha* and *Opium*. As soon as any danger of premature labor has passed away, the patient should take the *Parturient Balm*, or *Macrotys*, for the purpose of imparting tonicity to the reproductive organs, in connection with *chalybeates* if *anæmia* be present. When a symptom of this character attacks a pregnant female, the practitioner should be careful to ascertain the condition of the bladder, as not unfrequently a discharge of urine may be mistaken for it.

Not unfrequently the uterus is attacked with *spasmodic action*—the organ may be felt rapidly moving from side to side, with frequent convulsive movements, and will speedily induce premature labor if not relieved. I find it the best treatment in these cases, to evacuate the rectum by enema, and the application of heat to the part, as cloths wrung out of hot water, while internally such agents as *Macrotys*, *Lobelia* or *Gelsemium* may be given. Anodyne liniments may also be rubbed on the abdomen.

The impregnated uterus is sometimes attacked with *rheumatism*, commonly produced by the same causes which give rise to rheumatism of other parts. It is most common to those of a rheumatic dia-

thesis, and is frequently a metastasis of the pain from some other part. The symptoms are pain, augmented sensibility of the uterus, which may be limited to only a part of the organ, or extend over the whole of it, no contractions, pressure often increases the pain, which may extend into the loins, groins, and thighs, or which may suddenly be translated to some other part of the system. There is tenesmus or a constant desire to evacuate the bladder and rectum.

To remove this last condition, Eryngium, Gelsemium, or Rhus, may be employed, together with the hot hip bath. Rheumatism as a rule will be attended with more or less fever; the treatment, then, should begin, by selecting the proper sedative in combination with anti-rheumatics; thus Aconite and Macrotys may be called for, or the pulse being full and strong, Veratrum should be used in place of the Aconite, or one of the other anti-rheumatics being indicated, it replaces the Macrotys. The anti-rheumatics in common use are the Macrotys, Bryonia, Apocynum, Phytolacca, Sticta, Colchicum, Rhus, and Eupatorium; Acetate of Potassa and Asclepias are also useful in some cases. Within a few years several new agents, derivatives of coal tar, have been introduced to overcome pain; they are known as Antipyrine, Antifebrine, Antikamnia, as well as several others; they should be given with care, and their action studied; they are positively contra-indicated in weakened heart action. Quinia is often a useful agent, administered after secretion is established. The alkalies and acids often prove valuable anti-rheumatics, especially the alkaline diuretics. Baths, in these cases, are usually more harmful than beneficial.

The *movements of the fetus* in utero, are sometimes very *violent*, or *turbulent*, not only occasioning alarm to the mother, but much uneasiness, a sense of sickness, with general nervous agitation, sleeplessness, febrile symptoms, and often local pain.

This may be owing to an irritability of the nervous system, or to some preternatural susceptibility of the uterus. It may be removed by an attention to the bowels, and the administration of Viburnum, Pulsatilla, Macrotys, or Gelsemium, either singly or in such combination as indications may direct; the Parturient Balm will frequently prove beneficial; and when obstinate, a few doses of the compound powder of Ipecacuanha and Opium may be given. However, the practitioner should bear in mind, that narcotics should be employed as seldom as possible, during pregnancy, on account of their deleteri-

ous influence upon the nervous system of the fetus. The agents, as named above, will, as a rule, act promptly in overcoming the trouble, and should be used in preference.

Dropsy of the ovum usually takes place during the early months, and may be suspected by an unnaturally great increase in the size of the abdomen, which comes on suddenly, thereby differing from the gradual enlargement in ascites, and which is rendered still more certain when the pregnancy is positively determined. It is frequently, however, very difficult to form a correct diagnosis, and some of our oldest and most experienced practitioners have been mistaken in relation to it. Abortion is the common result, the fetus generally perishing before this accident occurs, especially if the collection of the fluid is great; and should it be born alive, it seldom survives a few days, or weeks at farthest. The only treatment, in this affection, is strict attention to the health of the female, and an absolute avoidance of the operation of paracentesis; for no practitioner is justified in performing this operation on a female who affords the smallest possible suspicion of pregnancy; at least until a sufficient time has elapsed for its determination by the positive signs, as revealed by auscultation, ballottement, etc. When the quantity of fluid is enormous, giving rise to serious consequences, the propriety of inducing premature labor by evacuating the amniotic liquid, may then be considered. Hemorrhage and Abortion will be treated of in the following chapters.

The accidental concomitants of pregnancy, are *hernia, tumors, syphilitic affections, calculus, deformed pelvis*, and *extra-uterine pregnancy*; the latter two have already been treated upon, the others require no especial consideration at this place; they will be again referred to under the head of Labor. The treatment for syphilitic affections will be the same as pursued under other circumstances, independent of pregnancy.

CHAPTER XXIII.

HEMORRHAGE AND ABORTION.

WHEN the fetus is capable of continuing its existence, independent of any uterine connection, it is said to be *viable*; and the period of its viability, though not precisely fixed, is generally admitted as early as at the commencement of the seventh month. There are, however, a few instances on record where children, born as early as the commencement of the sixth month have been reared, but these may be considered as the exceptions to the general rule. A fetus may move at birth, but this does not constitute viability. In cases where it is non-viable, or incapable of sustaining an extra-uterine existence, that is, previous to the seventh month, and is expelled from the uterus, owing to any cause whatever, an *abortion* is said to have taken place. Its expulsion at any time between the seventh month and full term, is a *premature delivery*; and the term *miscarriage* is popularly applied to either of these, indiscriminately, and generally conveys an idea of loss of offspring previous to the ninth month.

As hemorrhage and abortion are intimately related, being generally dependent on, or connected with each other, I will consider them under one head. *Hemorrhage* may take place at any period of pregnancy, and is owing to a greater or less detachment of the ovum from the uterus, and the more extensive the detachment, the greater is the probability of, or disposition to abortion. In the earlier months, life is seldom endangered by hemorrhage, in consequence of the smallness of the uterine blood-vessels, which do not admit of a large and rapid discharge of blood; but in the latter months, where these vessels have become much augmented in size, there is always danger from the hemorrhage which may then occur. It should be stated here, that women, laboring under hemorrhage in the earlier months, are occasionally lost, the flooding obstinately resisting all treatment; this is more usual with debilitated or anæmic individuals, especially those who have had previous discharges, with large loss of blood.

Abortion may be spontaneous, accidental, or designed, and may occur at any time prior to the seventh month, but more frequently about the third or fourth month, and generally at a period coincident with what would otherwise have been a menstrual period; this is undoubt-

edly owing to the delicate connection existing between the ovum and uterus at this time, whereby a separation of the former may ensue more readily from even slight causes than in the latter months, when this connection is more persistent. Abortion is not usually a serious accident, as many females abort several times, successively, and few women who bear offspring pass through their menstrual life without aborting one or more times. The principal dangers are from excessive hemorrhage, or the constitutional injury inflicted by a series of successive abortions. The *causes* of this accident are numerous, and have been divided into *constitutional*, or depending upon the condition of the maternal health; *ovuline*, or attributable to some disease of the ovum; *uterine*, or originating from an abnormal state of the uterus and its appendages; and *accidental*, or owing to circumstances not immediately connected with the condition of the uterus, ovum, or mother.

No particular class of females are especially liable to abortion; it occurs among those who enjoy the idle, sedentary, luxurious habits of fashionable life, and among those who are obliged to earn their daily subsistence by hard labor; the most robust may abort as well as those of a delicate and nervous disposition; though it may, probably, be more frequently observed among those who neglect an attention to the rules of hygiene. Authors state that plethoric females, those who are nervous or irritable, or extremely susceptible to external impressions, and those of indolent habits, abort more frequently than others; it has likewise been stated that abortion may occur as an epidemic. The *constitutional* causes are tuberculous diseases, as scrofula, anemia, phthisis, and recent cutaneous affections, epilepsy, hysteria, abdominal tumors, leucorrhea, diarrhea, dysentery, constipation, strangury, or, measles, scarlatina, pelvic peritonitis, typhoid fever, small-pox, and other acute diseases. Syphilis is likewise a common cause. Among these causes, when they occur, probably, syphilis, epilepsy, small-pox, and scarlet fever, are the most certain. Ascarides, piles, or other diseases of the rectum, as well as of the bladder, ovaries, and kidneys, by the irritation they communicate to the uterus, may likewise become causes.

Females, during pregnancy, or even after a recent confinement, should never be vaccinated, because in either case it exposes them to great hazard; this is a point to which especial attention should be paid, not only on account of the abortion which would very probably follow, in the first condition, but, in either, violent fever or inflammation of the veins, might be produced, resulting in death.

The *ovuline* causes are numerous; thus, the fetus may be affected with the parental diseases, as measles, small-pox, scarlatina, lead poisoning, mercurial salivation, typhus, etc., which may either occasion its death, or cause its attachment to the uterus to become so delicate as to render abortion unavoidable. Syphilitic disease may be communicated to the ovum by the male parent, as well as the female; and a seminal fluid vitiated by debauchery, or having its vitality enfeebled by age, may also give rise to an unhealthy embryo, the result of which will be an abortion. Atrophy, also hypertrophy of the placenta, may so debilitate its connection with the uterus as to become a cause of this accident. An effusion of blood between the placenta and uterus, termed by M. Cruveilhier *placental apoplexy*, may separate the placental connection, and give rise to abortion; placentitis, hydatids, syphilitic or fatty degeneration of the placenta or chorion, rupture of the umbilical vein, etc., will also produce it. Whenever the fetus is dead, from whatever cause, it becomes a foreign body, excites uterine contraction, and must inevitably be expelled, though frequently some time may pass between its death and expulsion. Other diseases of the embryo or its appendages as, hydrocephalus, pulmonary disease, disease of the chorion or amnion, etc., may likewise occasion abortion. Indeed, it is supposed, that the most common causes of this accident, are those referable to the condition of the ovum.

Among the *uterine* causes are, prolapsus, retroversion, anteversion, adhesions, uterine irritability, uterine congestion, fibroid tumors, polypus, cancer of the cervix, diseases of the tubes or ovaries, ulceration of the cervix, corroding ulcer, etc. Madam Boivin found that, among a great proportion of those females who habitually aborted at a regular period of utero-gestation, dissections revealed uterine adhesions to the bladder, rectum, or other neighboring organs; of course, if these adhesions are considerable, there can be but little expectations of cure.

The *accidental* causes are falls, blows, coitus, severe exercise, lifting heavy weights, working on sewing machines, rough motion on horseback, in carriages, or, in railroad coaches, or violent concussion of the body from jumping; and the membranes of the ovum may be so frail as to rupture upon a very slight compression of the uterus, occasioned by coughing, sneezing, extracting a tooth, or straining at the stool. Abortion is also occasioned by emesis, drastic purgation, tight-lacing, terror, grief or excess of joy, together with the criminal means frequently employed for this purpose. It is unnecessary to enter into a detailed relation of these causes, as they can seldom be obviated by the practitioner, whose principal efforts will be directed toward

preventing their results from becoming dangerous. Some women abort from the slightest causes, while with others again, the most serious accidents produce no influence of this kind. It is stated that abortion has been caused by the mere smelling of a pungent odor, but I presume such instances must be very rare. Among newly-married persons, abortions frequently occur from the abuse of coition, and this will likewise prove a very fertile cause of the accident among child-bearing females at any period, especially when they have some displacement or disease of the uterus; and I am fully of the opinion that what are termed, "abortions from habit," are chiefly due to this act. A recent author claims that fully one-half the spontaneous abortions are directly the result of excessive sexual indulgence during pregnancy. As a general rule, it may be observed, that when the ovum is healthy, and its placental connection is firm, the production of abortion in a pregnant female will be found very difficult to effect, except it be attempted by some mechanical means, when it will be apt to assume its more serious character; but if the ovum be diseased, the tendency to abort will be in proportion to the influence of the disease upon it, and its placental connection with the uterus.

Abortion is undoubtedly produced by the mammary irritation resulting from continued lactation during pregnancy; and with many females, conception, as well as menstruation, is retarded while the child continues to suck. But whenever the menses appear during suckling, the child should be immediately weaned, both for its own advantage as well as that of its mother; and the same course should be adopted when pregnancy happens. Frequently, a threatened abortion may be checked, and the female be enabled to reach full term, by immediately weaning the child upon the first appearance of pain or bloody discharges.

The *symptoms* of abortion are very much modified by the causes which produced it, and the period of pregnancy at which it occurs. If it happens during the first days of pregnancy, it is accompanied by little or no pain, and is often mistaken by the female for a difficult menstruation; and the ovum which usually passes away entire, and accompanied by a greater or less amount of blood, is looked upon merely as a coagulum or clot. When the pregnancy is more advanced, and especially when the abortion proceeds slowly and gradually, various premonitory symptoms may present themselves, as a feverish or irritable condition of the system, loss of appetite, nausea, cold extremities, swelling of the eyelids, with lividity, mental depression, intermittent pains in the loins, a sensation of weight about the vulva, frequent

desire to urinate or defecate, and flaccidity of the breasts; the pains continue to increase in frequency and force; they extend over the abdomen, running toward the coccyx, and finally assume the characters of true uterine contractions. A sanious and bloody vaginal discharge takes place, and, as the pains continue, the dilatation of the os uteri progresses, the membranes protrude, become ruptured, the liquor amnii escapes, and, sooner or later, the ovum, either entire or in part, is expelled. As all these symptoms, with the exception of rupture of the membranes, may occur in pregnancy without any subsequent abortion, the practitioner must be guarded in his diagnosis, unless he knows positively that the fetus is dead.

Most frequently, however, there are no precursory or constitutional symptoms; the first sign being the hemorrhage, which is more or less abundant, and is followed by a cessation of the fetal movements, diminished size of the abdomen, flaccid breasts, a sense of coldness in the hypogastrium, uterine contractions or pains, and expulsion of the fetus. If the fetus is dead, or the liquor amnii has been discharged, abortion will almost certainly take place, sooner or later, though no time can be positively determined after the death of the fetus, for its expulsion.

Between dysmenorrhea and abortion there is considerable resemblance in the character as well as the seat of the pains; both are intermittent, and both cease after expulsion of the uterine contents; hence, it becomes the accoucheur to proceed cautiously in forming his *diagnosis*. He must first endeavor to ascertain whether pregnancy has taken place; failing in this, he must inquire into the character of the previous menstruations, whether they were painful, accompanied with much hemorrhage, etc. And he should *never fail to examine all the discharges*, especially the clots, if they have not been thrown away, breaking them down between the fingers, and among which he may discover the entire ovum, or only a portion of it; indeed he should require the nurse to save all the discharges during the progress of the abortion, that he may, by this examination, not have a clot of blood mistaken for the ovum, and every practitioner should perfect himself in a knowledge of this kind, not only by an examination whenever the opportunity occurs, but also by procuring, if possible, ten or twelve specimens of ova at various periods of pregnancy, and preserving them, so as to accustom the eye to a familiarity with them; though it must not be forgotten, that the ovum may pass away without having been observed, or even be discharged in minute portions with the sanguineous discharge, more or less hemorrhage continuing for some

time subsequently. If he ascertains that the former menstruations were healthy, and that between the present difficulty and the last menstruation, one or two months have been passed without any discharge, these are strong grounds for suspecting abortion; if pregnancy exists, abortion is undoubtedly in progress. The blood in dysmenorrhea is menstruous, while that in abortion is sanguineous, and escapes in larger quantities than is usual to the catamenia. The finger should likewise be introduced into the vagina for the purpose of ascertaining the condition of the cervix, and if it be found shorter than normal, its orifice patulous and sufficiently dilated to admit the end of the finger, and especially if during a pain, the membranes are found tense and protruding, the diagnosis becomes more certain.

The diagnosis of abortion is more positive as the period of uterogestation advances, because the development of the uterus can then be readily ascertained, the pains will be more violent, the hemorrhage more abundant, and the dilatation of the os uteri more easily detected. After the fifth month the death of the fetus may also be more positively ascertained by auscultation, which will fail to detect the sounds of the fetal heart, and if it has been dead for a few days, there will be found an emaciation and flaccidity of the breasts, a diminution in volume of the abdomen, with weight in the hypogastrium, dragging sensations about the loins, and cessation of the fetal motions which were previously observed by the female. In the early months of pregnancy, if nausea, vomiting, or other sympathetic irritations connected with this condition, and which are present with a patient, become suddenly suspended, it affords grounds for suspicion of approaching abortion.

The *prognosis* of abortion varies according to its cause, as well as the period in which it occurs; females who abort are always exposed to more danger than when delivery takes place naturally at full term. In a few cases, death takes place during the accident, but more commonly no immediate fatal effects happen, though they **are very** apt to ensue as secondary results, being the **consequence** of some chronic disease of the uterus, ovaries, etc., produced by the abortion. Females at full term are more subject to acute maladies, which often prove **immediately** fatal, while the serious results of abortion more commonly manifest themselves at a remote period; yet grave consequences may occur speedily under either of these conditions. Abortion is very generally unfavorable to the fetus, because its expulsion happens during its stage of non-viability, and its death must inevitably take

place; or, the abortion may have been determined by its death. In this latter case, the fetus, acting as a foreign body, excites the uterus to contractions; but this effect may not take place for weeks and even months after its death.

Abortion occurs with more difficulty, and is attended with more danger, after the second month of pregnancy than before, on account of the increased size of the ovum, and the unfavorable condition of the cervix to dilatation; and the more advanced the pregnancy, the greater is the danger from hemorrhage. Probably, abortions occurring during the third and fourth months of pregnancy, are, as a general rule, more dangerous than at any other period. If the hemorrhage is profuse, abortion will be very apt to follow, though the practitioner must bear in mind, that large and frequent hemorrhages may occur, and yet pregnancy continue to the full term. If the pains occur at regular intervals, with dilatation of the os uteri, and protrusion of the membranes, the abortion almost always follows; and if the membranes be ruptured, it will certainly occur; though I know of one instance in which, in order to effect an abortion, the membranes had been perforated, and a large amount of fluid (*liquor amnii*) escaped, and yet the woman went to full term with a living fetus. The death of the fetus will likewise positively determine it, though a few instances are related of an opposite character.

If the abortion be produced by constitutional, accidental or mechanical causes, it is usually more violent or alarming in its results, than when owing to the uterine or ovuline. When it occurs during acute attacks, as measles, erysipelas, scarlatina, small-pox, typhus, etc., being the result of the severity of the attack, it is very apt to prove fatal, especially when it takes place before a mitigation or cure of the acute disease has been effected. When produced mechanically, the principal danger is from hemorrhage, peritonitis, or metritis. Usually, the more slowly the abortion comes on, the less danger is there to fear from hemorrhage, though the constitutional effects are more to be dreaded, than when it is accomplished with rapidity. Previous abortions always exert an unfavorable influence upon subsequent pregnancies, predisposing to a similar accident, and which, of course, requires the especial attention of the practitioner.

The ovum, in an abortion previous to the third month, is usually expelled entire, but after this period it commonly proceeds as at full term, the *liquor amnii* being first discharged, followed by the embryo, and sooner or later by the placenta. At the third and fourth months,

the placenta has considerably augmented in size, and has likewise formed close adhesions with the uterus; and this latter organ, though it may have acquired a degree of contractile power sufficient to expel the ovum, does not possess the contractility of tissue as developed at full term, and is frequently incapable of overcoming the attachment existing between it and the placenta. In an abortion at this period, a partial evacuation of the uterine contents, is very apt to be followed by a closure of the os uteri, and a cessation of the symptoms, leading the practitioner to believe that the abortion has happily terminated; but after several days the hemorrhage, generally preceded and accompanied with pains, again appears with increased severity, and if the cause be not removed, the patient dies. The cause, in this instance, is a retained placenta and membranes; the utero-placental adhesions having been overcome, hemorrhage, and sometimes copious hemorrhage, follows the separation of the placenta from the uterus, which remains detached in the uterine cavity, irritating the uterus and preventing its complete contraction, thereby promoting an increased hemorrhage, and causing a fatal termination, if the patient be not relieved by art. And whenever hemorrhage occurs, several days subsequent to an abortion, the practitioner should always suspect the presence of the placenta and membranes within the uterus, without regard to the statements that may be made to him, affirming that these have been expelled. He should at once make a vaginal examination, when he will probably find a partially dilated os uteri, with a portion of the placenta protruding. Should the placenta be only partially detached, the os may be slightly dilated, but without protrusion of the placenta, depending however upon its situation and extent of separation. Occasionally, the placenta decomposes, the uterine discharges become fetid, absorption of the putrid matter takes place, and an irritative fever ensues, requiring all the skill of the practitioner to overcome, or to avert its fatal effects. Putrefaction of the dead fetus takes place only when the membranes are ruptured, which admits the air into the cavity of the uterus; decomposition without putrefaction ensues when the membranes are entire. Absorption of the placenta has been observed, both after an abortion, as well as after a natural accouchement. Sometimes an effusion of blood into the placenta may occur, and by imparting to it a kind of organization, produce what are known as "fleshy moles."

The TREATMENT varies according to the symptoms which are presented the principal indications being, to prevent the abortion if

possible, and when this can not be effected, to assist the expulsion of the uterine contents, and likewise to remedy any subsequent accidents. When the pains are somewhat continuous, and are experienced previous to the hemorrhage which considerably mitigates their severity, the case is very probably one of uterine congestion; but when the hemorrhage is observed first, followed by pains increasing in severity and with well marked remissions, abortion is about to ensue. In all cases of abortion, the practitioner should carefully examine the condition of the cervix, except in instances where the death of the fetus has been positively ascertained; if it be of normal length and thickness, but slightly dilated, unfavorable to the speedy expulsion of the ovum, and if the hemorrhage be not too threatening, an attempt may be made to check its farther progress; but if it be dilated, short, the os patulous, and attended with considerable hemorrhage, means must be adopted which will favor the speedy expulsion of the uterine contents. And in making this examination, no roughness or violence must be used, lest the symptoms of the abortion be aggravated.

In a great number of cases, whether abortion ensues or not, all the treatment required will be, rest in the recumbent position, a cool, hard bed, perfect quiet, avoidance of stimulants, and all excitement, quieting of nervous fears or anxieties, cooling drinks and light diet, with an occasional dose of the compound powder of Ipecacuanha and Opium, say four or five grains repeated every two, three, or four hours, for the purpose of subduing the pains. It is claimed by the most recent writers, that to arrest uterine action, nothing can be compared with Opium; it is recommended in half-grain doses, repeated in thirty minutes, if necessary, to allay uterine excitation and control the pains. Laudanum may be used; a drachm in starch-water enema. But where this course does not speedily effect a mitigation of the symptoms, there having been no escape of the liquor amnii, Viburnum Prunifolium should be given; one or two drachms to four ounces of water, in teaspoonful doses, will usually prove efficient. A blister applied to the sacrum was formerly much in use; it will likely prove beneficial in some cases, and should be tested where other means fail. Should any displacement of the uterus, or other affection exist, it must be treated as heretofore advised. Nauseating with a preparation composed of three or four parts of the tincture of Lobelia, and one of the tincture of Opium, has been recommended and successfully employed in some cases, but I deem it inferior to the means above named; although it may be used, should

that fail. Care is required not to cause emesis, which might render the abortion inevitable. The administration of Stramonium seed has been highly spoken of, but I have never seen its action in such cases, and can, therefore, say but little about it. Tincture of Cannabis Indica, in doses of five or six drops every one, two, four or six hours, has also been advised as an anodyne as well as to arrest the sanguineous discharge. If the hemorrhage be slight, it may not require any special attention, but when it is considerable, effort should be made to check it. For this purpose, cloths wet in cold vinegar and water, or ice applied to the hypogastrium and pudendum has been recommended; but the application of ice within the vagina, or cold vaginal injections, recommended by some authors, should be used with great caution, lest they produce the accident we are attempting to avert. Injections of water as hot as can be endured, will give better results, and affect the patient more pleasantly. In connection with these, internal means may be used, a few drops of the oil of Erigeron, or oil of Erechthites may be given, in mucilage or on sugar, every ten, thirty, or sixty minutes, according to the severity of the hemorrhage; or a powder composed of burnt Alum and Sulphate of Iron, three grains, Capsicum, one grain, may be administered as often as the urgency of the symptoms demand; the burnt Alum and Sulphate of Iron form a valuable hemostatic, and may be made by mixing together two parts of Sulphate of Iron and one of Alum, and exposing them to heat in a stone or clay dish, until the mixture assumes a reddish color. Other astringents may be employed in the absence of those named, as Tannin, Hamamelis, Gallic Acid, etc. An agent in common use as a hemostatic is powdered Alum and Nutmegs; the late Prof. Meigs recommended it in the proportion of five grains of the former to one of the latter as a dose, to be repeated every half-hour or hour. It will frequently be found that internal remedies derange the digestive organs and occasion constipation, without exerting any influence whatever upon the hemorrhage; in such instances a soft sponge, or plug of cotton wadding moistened with solution of Alum, Tannin, or Perchloride of Iron, and introduced within the vagina so as to slightly press against the os, will promote coagulation and tend to arrest the flow; and this application may be worn for several hours at a time, changing it only as required. I regard the solution of Perchloride of Iron, as just mentioned, as one of the most reliable agents at our command, in controlling uterine hemorrhage, and have frequently gotten prompt results from it, after other means have failed. It may

be used on absorbent cotton, after which all coagula resulting therefrom should be removed by hot water vaginal injections. A rectal enema, composed of Lloyd's Ergot, two fluid drachms, thin Starch solution, one fluid ounce, retained in the rectum for an hour, repeating it two or three times a day, if necessary, has proved successful in some instances in arresting the pains and checking the hemorrhage. It is not required that the patient should be confined to the recumbent posture for more than the first two or three days, and, subsequently, even though some flow be present, only occasionally, according to the symptoms; a constant lying in bed will affect the general health, occasion anorexia and nervous excitement, and rather tend to facilitate instead of prevent the abortion. On the other hand, should there exist any congestion or irritability of the uterus, an erect position, or any bodily movements, increase the liability to abort, hence, these conditions must be removed before allowing the female to move about.

Should these means fail to arrest the hemorrhage, and there is no doubt in the mind of the practitioner but that the expulsion of the ovum must take place—is inevitable—the tampon or plug should be employed. This consists of pieces of linen cloth, muslin, silk, or balls of absorbent cotton. The tampon can, as a rule, be best applied by using Sims' speculum. It is always well to wash the vagina out with hot water; then, if the cotton is used, the balls may be carried to the parts by means of dressing-forceps, firmly packing them around the cervix. The first few balls should be sprinkled with Iodoform. If muslin is used, the pieces should be about three or four inches square, which are separately introduced into the vagina, until it is completely filled and distended; these are to be kept in place by a napkin or bandage, and may be allowed to remain for six or twelve hours, but never to exceed twenty-four. Sometimes sponge is used, but I think it inferior to the pieces just referred to. The first piece introduced may be medicated with Tannin, Alum, or other astringent, and the remaining pieces forming the tampon should be moistened with Carbolized Oil, to admit of their ready removal, and to act as an antiseptic. It must be especially borne in mind by the practitioner, that the tampon is never, under any circumstances, to be used after the fifth month of pregnancy; because, the uterine capacity having become much augmented, its cavity may become distended with blood or coagula, and cause a fatal result. Previous to the fifth month, however, it is incapable of containing an amount of blood

sufficient to prove fatal from a concealed hemorrhage. Upon the removal of the tampon, a coagulum may be observed attached to its upper part, in the center of which the ovum, or its remains, will generally be found. Cotton-wool was regarded by J. Marion Sims as the best material from which to prepare a tampon. He advises that it be soaked in some antiseptic solution and then molded into small disks; they are now carried high up, with the dressing-forceps, and packed tightly around the intra-vaginal portion of the cervix, and so on until the vagina is filled. This makes, probably, the most solid tampon that can be used. When the tampon is removed, after about twelve hours, the parts should be carefully examined, and, in case the cervix is not sufficiently dilated to allow the ovum to pass, then at once re-apply the tampon as in the beginning, and so continue until dilatation follows. The tampon not only acts as a mechanical agent in controlling the hemorrhage, but hastens the expulsion of the ovum by exciting contractions of the uterus. Ergot is usually indicated in cases requiring the tampon; and when associated they act very well. The ovum, as a rule, is expelled entire in cases where this treatment is used. Should the presence of the tampon induce dysury, the bladder must be evacuated by means of a catheter; and during the whole treatment the female should be kept in the recumbent position, and not allowed to arise until all danger from hemorrhage is over. The tampon ought never to be used when there is any possibility of checking the abortion, as it is very apt to increase the tendency to abort, in consequence of the irritation of the cervix produced by its presence having extended to the fundus; beside, the external discharge of blood being suppressed, it continues to be effused internally, gradually separating the ovum from the uterus, until it finally passes off, surrounded with a compressed coagulum. Neither should it be employed after the expulsion of the ovum, nor when the os uteri has dilated to an extent that will admit a finger to pass and remove the embryo.

Females who habitually abort in the early months of pregnancy, should, after the symptoms of abortion have been removed, be advised to remain most of the time in the horizontal position, avoiding all fatigue and violent exertion, until the uterus has risen above the superior strait of the pelvis. The employment of the lancet, in cases of abortion, is recommended by some authors, but I can not perceive its utility; the detachment of the placenta from the uterine wall, which is the cause of the hemorrhage, can not certainly be remedied by a

loss of blood from some other part of the system, for in all the cases which I have witnessed treated by blood-letting, the separation continued to progress, with augmented hemorrhage, and the only result gained was a degree of debility and disposition to disease, on the part of the female, probably greater than would have resulted had the use of the lancet been omitted. It is true, that in consequence of the prostration of nervous and muscular force effected by its use, it may overcome rigidity of the cervix, and favor the dilatation of the os uteri, when the fulfillment of these indications is desired; but then we have remedies which produce the same results without disposing a part or all of the constitution to any of the after disastrous consequences so common to blood-letting; as Lobelia, and still better, the tincture of Gelsemium, from the relaxing influences of either of which the patient will speedily recover. I am aware that bleeding, in many cases, may arrest or modify the expulsive contractility of the uterus, but it is effected at a great expense to the constitution of the patient, and is by no means a safe or desirable method of treatment; Opium, either alone or combined with Lobelia or Gelsemium, will not only produce the same results, but will succeed in cases where bleeding fails. As to bleeding for the relief of plethora, or of a congested condition of the uterus, the hemorrhage undoubtedly affords all the benefit that can be had from venesection, especially in the latter condition; and the ordinary means advised for overcoming or relieving either of these states will be found fully efficient without a resort to the lancet—though the lancet saves time and labor, to the physician. For the purpose of equalizing the circulation, it has been advised by some accoucheurs to bathe the lower extremities of the female in warm water; with some patients this course may be attended with benefit, but it should always be employed with caution, as among many women it will be found to facilitate the abortion; it is only in hemorrhage after the expulsion of the ovum where much advantage will be derived from this local bathing.

If by the means employed the abortion is not prevented, or if it be so far advanced that no hope for checking it can be reasonably entertained; the pains increasing together with the hemorrhage, the os uteri gradually dilating, and the ovum being within reach of the finger, all that the practitioner can do is to patiently await the efforts of nature, and carefully watch and treat the hemorrhage; as a general rule, any artificial interference is highly improper, and might give rise to serious consequences. The practitioner must be very careful not to rupture

the membranes in the early months, for the purpose of facilitating expulsion, as it is always desirable that the ovum be expelled entire, for when the membranes are retained after the discharge of the fetus, there is danger from hemorrhage; and when, in cases of such retention, it is found that the contractions of the uterus are insufficient to separate and expel the membranes, the os being sufficiently dilated, agents may be administered which will promote these contractions, as Ergot, Macrotys, Pulsatilla, or Quinine. Creed's method will often stimulate the uterus to increased action. Agents of this class are not to be depended on when the hemorrhage is alarming, but give way to more radical treatment, as will be presently noticed. The *fresh* inner bark of Cotton root, in strong infusion, will generally excite the uterus to energetic action; but this agent can rarely be had. So will powdered or grated Nutmeg in teaspoonful doses; also a combination of Borax and Cinnamon. If this does not produce the desired effect, and the hemorrhage continues unabated, it will be proper for the practitioner to introduce a finger within the canal of the cervix, as far as possible, then bend it so as to resemble a blunt hook, and in this way remove the membranes, and in doing this it may become necessary to introduce the whole hand into the vagina; or a wire blunt-hook, which will admirably answer the purpose, may be made, by bending a piece of fine wire so as to form two parallel strips nearly in contact with each other, the curved end of which is to be again bent so as to form a hook; this may be introduced into the uterus, whenever hemorrhage is owing to retained membranes, for the purpose of removing them. Other instruments have likewise been recommended for this purpose, as Bond's placental forceps, and Dewees' placental hook. But in the introduction of the finger, or any of these instruments into the canal of the cervix, no force must be employed, too much care and gentleness can not be observed; no attempts whatever should be made, to effect dilatation, nor should these means be employed at all until the cervical canal has become cylindrical and sufficiently open for their free intromission. And as the development of the uterus previous to the fifth month is not such as to warrant any fears of a serious internal hemorrhage, the tampon may be used, in conjunction with the other means, to check flooding, if circumstances prevent the removal of the membranes. The introduction of the tampon is sometimes attended with such disagreeable and painful sensations that the patient can not endure its presence for even ten minutes; in such cases, as well as in cases where it does not check the hemorrhage, the evacuation of the uterine contents must be promoted as soon as possible. It may be proper to

remark here, that when the hemorrhage is such as to threaten the life of the mother, every means must be employed to arrest it, even should the means effect the death and expulsion of the fetus, as the safety of the mother always demands such sacrifice. When the death of the fetus has occasioned the abortion the hemorrhage is not generally excessive.

A very good rule to govern one's actions in cases of hemorrhage from abortion is, after deciding it to be inevitable, to use the tampon as has been suggested, in cases where there is no dilatation of the cervix, and so continue together with the administration of Ergot, until dilatation is produced. Should the hemorrhage be alarming, and the cervix already fully dilated and relaxed, then forcibly remove the ovum by introducing the fingers or hand.

In the more advanced stage of pregnancy, when in consequence of excessive hemorrhage or other cause it becomes necessary to facilitate the expulsion of the fetus, the membranes may frequently be ruptured with advantage, because at this period, the uterus has increased in size sufficiently to receive two or three fingers, or even the whole hand, should it become necessary to remove a retained placenta. And the extraction of the placenta should always be effected, when the abortion occurs at a period of utero-gestation, in which the uterus will permit the introduction of the hand within its cavity. Other means may likewise be employed to favor the expulsion, as Ergot, Macrotys, injections of hot water together with Creed's method. Cold applications may be made to the pubes and hypogastrium, to aid in arresting the hemorrhage. At this period I usually prefer as an internal hemostatic, the tincture of Cinnamon, of which from half a fluid drachm to a fluid drachm may be given every ten, thirty or sixty minutes, as the urgency of the case requires, in a wine-glass of sweetened water; ten or fifteen drops of Laudanum or Viburnum may be added to each dose, in case the pains are very severe. The Cinnamon and Ergot may be administered together in doses of from fifteen to thirty drops of each; the combination of the two agents exhibit more striking hæmostatic properties than either administered singly. After the embryo and its membranes have passed away from the uterus, should hemorrhage still continue, it must be treated in the same manner as recommended for flooding after delivery at full term. Intra-uterine washings of a solution of Iodine after the evacuation of the contents, have been advised both for its antiseptic and hæmostatic effect.

A weak solution of Sulphuric Acid has been frequently employed in hemorrhages occurring during pregnancy, as well as after delivery,

with decided benefit. It is exhibited as a vaginal enema, ten or fifteen drops of the acid being added to three or four ounces of warm water. Care should be taken, however, not to employ it when it is desired to check the abortion. Many persons use this injection with the criminal intention of procuring an abortion.

In cases of excessive hemorrhage occurring several days after the abortion has apparently terminated, and which, as previously stated, are owing to a retention of the placenta and membrane, the wire blunt-hook may be slowly and carefully passed within the canal of the cervix, and the membranes extracted by means of a gentle manipulation; if this can not be accomplished, the practitioner will most likely have to contend with the effects of putrefactive absorption. The patient with whom there is a retention of the placenta is exposed to hemorrhage, to septicæmia, to hydatoid degeneration of the placenta, or to polypoid growths of which the placenta forms the nucleus; hence the necessity for not allowing it to remain too long within the uterus, and especially when the flow is continuous or excessive. Putrefactive decomposition may be known by a fetid lochial discharge, and absorption of the putrid matter gives rise to an irritative fever which may prove dangerous. The fever must be treated upon general principles, using Aconite or Veratrum as indicated, and being careful to support the strength of the patient; and the vagina must be frequently syringed with water, as hot as the patient can endure, in which shall be used Borax, Asepsin, Carbolic Acid, Distillate of Hamamelis, or Fluid Hydrastis, as the practitioner may prefer, for the purpose of removing the putrified material as soon as it forms; and for the purpose of obviating putridity of the remaining portions of the placenta or membranes, soft cotton wool has been recommended moistened with diluted Carbolic Acid, or other antiseptic, and carefully introduced within the canal of the cervix, (dilating this, if necessary, by means of tents), removing it every two or three hours, and replacing it with a new pledget. As a rule, I believe pledgets of lint should not be introduced into the cervix at this time, as it might be an obstruction to the free drainage of the uterus, and as a result of pent up purulency thwart the very object we are trying to accomplish. Internally, to lessen the dangers from septicæmia, such agents as Chlorate of Potash, Baptisia, Phytolacca, dilute Nitro-Muriatic Acid, Asepsin and such other remedies as would tend to eliminate the poison that might have been absorbed by the system may be administered, as well as tonics, good diet, etc., as indicated from time to time. I have in several instances succeeded in preventing any serious consequences by adminis-

tering, in connection with the general treatment, Macrotys, Pulsatilla, Phytolacca, together with direct sedatives, if there happens to be an increased temperature, as Aconite, Veratrum or small doses of Digitalis. The Parturient Balm (Am. Dispensatory) as a uterine tonic is a good remedy, especially during convalescence. The infusion of Digitalis is useful in some cases. Peruvian bark in Port wine has also been used in a few cases with apparent benefit, where a tonic is called for.

After an abortion, especially in advanced pregnancy, it may become proper to apply a bandage around the abdomen, the same as after ordinary labor, and the patient should be kept for a few days in a state of rest; if there be much exhaustion from loss of blood, the diet must be similar to that recommended in uterine hemorrhage, or flooding after labor at full term. A lochial discharge, as well as secretion of milk, is most commonly present, after abortion in the advanced stage of gestation.

The *sequelæ*, or after consequences of abortion, are irritative fever, metritis, peritonitis, phlebitis, ulceration of the cervix, anæmia, leucorrhæa, menorrhagia, dysmenorrhæa, organic disease of the uterus, sterility, or phthisis, either of which, when present, will require the treatment appropriate to such abnormal condition.

When an abortion has once taken place, it is very liable to recur during the following pregnancy, and to prevent the occurrence of which, the practitioner should endeavor to ascertain its cause, and remove it, if possible, by the appropriate treatment pursued during the intervals between the pregnancies, as well as during pregnancy previous to the manifestation of the aborting symptoms. It will be still more efficacious, however, if the patient, while endeavoring to become cured of her difficulty, will give the reproductive organs rest by an absolute avoidance of sexual excitement, cohabitation, and pregnancy, for a considerable length of time. Should it be owing to tumors, diseased ovum, or other intra-uterine diseases, internal treatment will be of little avail; though in these cases the internal use of alteratives, uterine tonics, proper diet, exercise, etc., may be adopted, with a faint hope that good may follow. If a fissured os and cervix uteri be the cause, as determined by a careful examination, and which is often present in those cases of abortion that occur successively in the same woman at the same period of gestation, the fissures must be healed by local applications of Nitric Acid, Nitrate of Silver, Caustic Iodine, or Chromic Acid, etc., being careful to apply these agents in

a manner that will not destroy the tissues of the parts; at the same time administering such agents internally as may be indicated to relieve pain, remove anemia, or lessen uterine congestion, etc., when either of these are present. The trouble being a slight fissured condition, it may often be cured, or at least benefited, by the direct application of caustics; if, however, the cervix should be deeply lacerated, then nothing short of a careful operation, known as trachelorrhaphy, will restore the parts and overcome the trouble. It is necessary to remove all cicatricial tissue, after which the parts may be sutured together. Uterine congestion, as a cause of abortion, requires an avoidance of coition, diuretics, regularity of bowels, moderate diet and exercise, and sometimes warm hip baths. If the uterus be displaced, it must be restored to its normal position; should ulceration of the cervix uteri be a cause, it must be treated by applying locally concentrated Nitric Acid by means of a pine stick porte-caustic, Nitrate of Silver, solution of Sesquicarbonate of Potassa, solution of Sulphate of Zinc, etc., the application to be made by means of a speculum. The patient must likewise be kept in a state of rest, and if treated during pregnancy, no vaginal injections must be used. Dysmenorrhea is frequently a cause of abortion, and when present, the functions of the uterine system must be attended to, administering uterine tonics, Chlorate of Potassa, and pursuing the means generally recommended in Eclectic teachings to remove the difficulty; and so in all other uterine derangements. In those cases of abortion due to an enfeebled condition of the uterus, to a premature disintegration and exfoliation of the decidua, or to morbid nervous excitability of the reproductive system, I have found the *Helonias Dioica*, *Pulsatilla*, *Senecio* and *Macrotys* to be excellent remedies, in combination with Chlorate of Potassa; and, indeed, have even found it efficacious in several instances where the cause of the abortion was quite obscure; it is especially required in all these instances that the uterus have a long period of rest. If the abortion is owing to a syphilitic taint of the system, this must be remedied by the usual treatment for this disease, administered, in most instances, to both parents. The bowels must be kept regular, the diet must be nutritious, avoiding fats and acids, the surface of the body must be frequently bathed with a weak alkaline solution, and too much exercise must be prohibited; if the male parent is contaminated with the disease, but little benefit can be expected unless he is also placed under proper treatment. The administration of Mercury, so highly recommended by some authors, is

of no utility, as this agent will not only effect no cure of the disease, but has a strong tendency to destroy the vitality of the fetus, and thus add to the already existing cause of abortion. Any other disease with which the patient may be affected, whether general or local, must, if possible, be eradicated by the appropriate remedies, which may be employed not only during the interval between pregnancy, but likewise when this condition is present. Fatty degeneration of the chorion and placenta, detected by careful microscopic investigation, will require the same treatment pursued in similar degeneration of other organs. Chlorate of Potash has been recently used, with marked success, in a number of cases where women habitually aborted owing to degeneration of the placenta, and, as a consequence, faulty nutrition of the fetus. This remedy, when further tested, will, I believe, prove to be a specific in this diseased condition of the placenta.

Anæmic or chlorotic patients should be treated with vegetable and chalybeate tonics, among which I prefer Acid Solution of Iron; those who are plethoric require light and moderate diet, exercise, regularity of bowels, and depletion by diuretics; and coition should be very moderate until pregnancy occurs, during which it must be positively prohibited. If the patient resides in a miasmatic district, usually so called, a removal will in many instances be followed with benefit; though occasionally the internal use of Sulphate of Quinine, Fowler's solution of Arsenic, or dilute Nitric Acid, will be found to answer an excellent purpose. If she be giving suck when pregnancy occurs, the child must be weaned; if there be any vesical or rectal irritation, hemorrhoids, or a constipated condition of the bowels, these may be overcome by an attention to diet, aided by laxatives, anodyne and mucilaginous enemata, quiet, and an avoidance of all active medicines. As habitual abortions usually occur at a regular period of pregnancy, the patient should at this period more frequently assume the recumbent position, upon a hard mattress, in a cool room, and be otherwise treated according to the peculiarities or indications of her individual case; and which treatment should be perseveringly pursued until the aborting period has passed by.

When habitual abortion obstinately resists our endeavors to remove it, it will ultimately destroy the constitution of the patient; and it therefore becomes necessary on her part to pursue a rigid and self-denying course. The indications are: firstly, to avoid pregnancy, until the functions of the reproductive organs have been restored to a normal condition; and, secondly, to effect this restoration. The only

method by which the first indication can be fulfilled is absolute and positive discontinuance of sexual intercourse for a year or longer—or for such a length of time as may be required to effect a healthy condition of the generative functions. I am aware that various other means may be suggested, or pursued, to prevent pregnancy, but, in the cases under consideration, it must be especially borne in mind, that not only is an avoidance of this condition required, but it is imperatively demanded that the sexual organs be maintained in a state of quiet, entirely free from all excitement, and which can only be effected by rigid abstinence.

The second indication is to be accomplished by bestowing a careful attention toward both the uterine and general systems, employing tonics, alteratives, and such other measures as may from time to time be required. The tonics which I have found more commonly beneficial are, *Macrotys*, *Pulsatilla*, *Achillea*, *Aletris farinosa*, *Helonias Dioica*, as indicated; they are given either singly, or any two that are indicated may be combined or given in alternation. Sulphate of Quinine will sometimes be called for. The Parturient Balm (Am. Dispensatory), as prepared by Lloyd Bros., I regard as an excellent uterine tonic also; indeed, the vegetable uterine tonics, generally, may be employed with advantage. The agents which I term uterine tonics, and which are described in the Am. Dispensatory, appear to exert an especial healthful influence upon the uterus, but of their peculiar *modus operandi*, I am free to confess my ignorance. In addition to the special tonics mentioned, it was formerly the custom of the earlier Eclectics to administer, in these cases, alteratives, so called, as compound syrups of *Sarsaparilla* and *Stillingia*; together with Iodide and Bromide of Potassium; at present these are seldom thought of. The general tonics, however, may be used in connection with the special treatment, as the practitioner may deem proper.

In conjunction with this treatment, the bowels must be kept in a soluble condition by the use of mild laxatives, so given as to produce one, but not over two, alvine evacuations daily, approximating as nearly as possible to the natural healthy discharges; and for this purpose I prefer the trituration of *Podophyllin*, or the small *Podophyllin* and *Hydrastin* pill; this may be omitted occasionally, and cold or tepid enemata employed, as may be found to suit each particular case. In many cases, a few doses of *Cascara Segrada*, or *Cascara Cordial*, will prove useful, repeated once or twice a day for several consecutive days at a time, according to its effect. Active purgation is invariably

to be prohibited, except in plethoric patients, when it may be resorted to every week or two, if not contra-indicated. Bathing the surface daily with cold or tepid water, and once a week with a weak alkaline solution, and drying with considerable friction, will materially assist in the restoration to health, by bringing about a normal condition of the skin, the functions of which will be found more or less impaired in these cases; the shower-bath has also been advised, either of rain-water or salt water, and where it is applicable it will usually prove beneficial; its temperature should range between 75° and 85°, and the best time for using it is upon rising in the morning. Moderate exercise will be found indispensable, and an avoidance of all indolent habits imperative, as lying in bed late in the morning, lying down after a meal to sleep, sleeping on feather beds, etc. The diet should be light but nutritious, using tender fowls, meats, etc., but always avoiding fats and acids; and very weak patients may use Port wine, porter, or other suitable stimulants, in moderate quantity, during the dinner meal. Occasionally, a change of air will prove serviceable. All bathing must be omitted during menstruation. By a perseverance in this course for one or even two years, the most obstinate cases of habitual abortion, when not owing to uterine adhesions, may be cured; and it may be proper to remark, that should pregnancy occur shortly after dismissing the patient as cured, it is very necessary that close attention be bestowed upon that condition, until five or six weeks have passed beyond the previous aborting period, in order to promote the certainty and permanency of the cure.

It may be briefly stated that when habitual abortion is due to a morbid nervous excitability of the reproductive system, to premature disintegration and exfoliation of the decidua, Helonias, Dioica and Chlorate of Potassa are the remedies; when due to uterine displacements, overcome the trouble by using supports, if necessary, and administer Aletris, Nux, Parturient Balm, and Belladonna; when to a low grade of uterine inflammation, Aconite, Pulsatilla, and Macrotys; to a hard, contracted condition of the cervix, with more or less irritability, Gelsemium, Aconite, Macrotys and Lobelia; to a neuralgic or rheumatic affection of the uterus, Aconite, Macrotys and Gelsemium; if there be a sluggishness of the circulation, lack of nervous energy, Nux, Xanthoxylon, Gelsemium, and Rhus; to irritability of nerve centers, Bromide of Potassium, Belladonna, Gelsemium, Conium, etc. Any constitutional disease under which either of the patients may be laboring, will require the proper treatment for such affection.

Before leaving this subject, I wish to refer to two things which may occasion some trouble to the practitioner in the treatment for preventing abortion; the first is, the difficulty in prevailing on some females to keep quiet and confine themselves to the recumbent position for a sufficient length of time. Not feeling any sickness, nor suffering from any pain, the patient will be apt to treat the advice of her physician, in this matter, very lightly, unless it is especially urged upon her, explaining to her the consequences of a different course of action, and the advantages attending its observance, among which may be named the diminution of the tendency to abort, by checking or overcoming irritability or other morbid results due to the cause of such tendency, and the strong probability of its permanent cure, when the habit has been overcome in any one pregnancy. The practitioner can not be too particular in regard to this matter. Though he must not forget that too long a continuance in the recumbent position is apt to give rise to morbid symptoms that may promote instead of prevent the abortion. The second point is relative to the decided objections which are frequently made to vaginal examinations. When a female, during an abortion, objects to an examination of this kind, and the symptoms are not very urgent, the physician will treat the case as well as circumstances will permit; but when the hemorrhage is great, and the serious consequences that may happen from a persistence in the objection have been explained, without effecting any change in the will of the patient, it would be improper for the practitioner, so far as his own reputation alone is concerned, to assume the whole responsibility of the case. He will, therefore, not manifest any irritation, nor abruptly leave the patient, but will state to the friends, or the patient, that the case has assumed a character which leads him to desire council, and then, should any fatal result ensue from a continuance of such obstinacy, this course will free him from any subsequent imputations, of neglect, malpractice, etc.

In a premature labor, the management will be the same as recommended for labor at full term; for as a general rule, during the last three months of pregnancy, the hand may be introduced within the uterus for the purpose of performing any manipulations which may be required. But I would make one observation, that if the hand of the practitioner be very large, and a manual operation is demanded during the seventh or eighth month, it will be safer for the patient, and very humane on the part of the medical attendant, to send for some medical friend, with a small hand. This is a point too little heeded, and which, of itself, is frequently a cause of grave results.

CHAPTER XXIV.

LABOR.

LABOR, or PARTURITION, is that function by which the matured fetus, together with its secundines, are expelled from the uterus; it occurs at the end of nine calendar months and one week, or about two hundred and eighty days from the last menstrual appearance, and about one hundred and forty days after quickening. A few days, either previous or subsequent to this time, constitute practically no material difference. At this period, the hitherto inactive nervous and muscular systems of the uterus become stimulated into action, causing contractions of this organ, which are always accompanied with pain, in a greater or less degree, and which cease only when the uterus has expelled its contents; as the contractions are invariably attended with pains, the terms, *labor pains*, and *uterine contractions* are employed synonymously. As a general rule, labor, though painful and exposed to danger, may be expected to terminate favorably, and without artificial aid. The average duration of labor is six hours, or according to some authors, four, but which depends upon the amount of power in action, and the degree of resistance which is presented. Cases have been known, in which labor has been completed in ten or fifteen minutes, while with others, again, from four to seven, and even ten days have passed, before the fetus has been expelled into the world. The investigations of M. Quetelet, Dr. Buck, and others, indicate that more births occur at night than during the day, there being five children born at night, for every four born during the day; and also, that the least number of births occur at midnight, and at noon. Yet these day-births may, in many instances, require the attention of the accoucheur during the night.

The *immediate* or *exciting cause* of labor, is not satisfactorily understood, though physiologists of all ages have advanced various theories. Thus, some have attributed it to a supposed struggling of the fetus, in an endeavor to procure a more adequate amount of nourishment than is received while within the uterus; others again, have supposed it to depend upon the motions of the fetus, in seeking to relieve itself from its constrained position, to remove itself to a less elevated temperature; or, to obtain access to the atmosphere for the purpose of breath-

ing. But these, or any other theories which suppose the fetus to be the principal agent in its own expulsion, are now known to be incorrect; the fetus is merely a passive agent in parturition, and a dead one is expelled as easily as one living. Some, viewing the uterus alone as possessing the power necessary to effect labor, have supposed, that when no further development of uterine fiber can take place, the contractions ensue; others assert, that they commence as soon as the antagonizing condition, which exists between the fibers of the cervix and those of the fundus, are overcome, the latter having the preponderance of action. Dr. Tyler Smith believes the expulsion of the ovum to be effected by certain changes occurring in the uterus, and which are due to ovarian excitement,—the ovaries, in all cases of pregnancy, assuming a regular periodical action at or near the tenth period from the last menstruation. This hypothesis, however, is inconsistent with the recent views concerning nidation. Cases have been recently reported, also, in which the ovaries have been removed during pregnancy without affecting labor in the least, which came on and was perfectly natural at the proper time. Sir James Simpson has advanced the opinion that parturition is the result of a separation between the deciduous membranes and the uterine walls, and which is due to degeneration of the decidual structure occurring toward the full term of pregnancy. But it is unnecessary to enter into an explanation of all the views which have been promulgated on the subject; suffice it to say, that they are all unsatisfactory, and we are compelled to admit that it is the result of an unknown natural law, or, as expressed by Avicenna, an Arabian physician of the eleventh century, “that at the proper time, labor comes on, by the grace of God;”—or, as a medical man once remarked, “it is involved in as much obscurity as the cause why peaches ripen in August, and strawberries in June.” But though the researches of physiologists have failed to discover the exciting cause of labor, they have established the fact, that as with all other uterine functions, periodicity exists in this also; as labor manifests itself at a period corresponding to that of menstruation, and which, but for the conception, would have been a menstrual term.

The principal agents, in the accomplishment of parturition, are the contractions of the muscular fibers of the uterus, aided in ordinary cases, during the second stage, by the diaphragm and the abdominal muscles; the expulsive efforts of all these agents finally determine the evacuation of the uterine cavity, which, when completed, the organ returns to its non-gravid state, measuring from two and a half to three

inches in length, about an inch and a half in width, and a half or three-fourths of an inch in thickness. The pain, which attends each uterine contraction, is supposed to be owing to the pressure these contractions exert upon the nerves of the uterus, and also to the constant traction upon the circular fibers of the cervix, by the longitudinal fibers.

The PREMONITORY SIGNS OF LABOR are several; a *subsidence*, or *sinking down of the uterus* in the abdomen, is the first, and probably most striking; the uterus, which had previously extended to the epigastric region, sinks lower, and appears to spread out laterally. This symptom may occur as early as two weeks previous to the first pains of parturition, but usually, it is observed only a few days before. The mechanical impediment to respiration being thus removed, the female experiences much relief, she respire with greater ease, feels lighter, cheerful, and more comfortable, less apprehensive, and is better able and more disposed to action and motion than she had been for some time previously. The lowering of the uterus occasionally produces a puffiness and swelling of the lower extremities, rendering locomotion difficult or impossible. In those cases where nausea or vomiting was present, from mechanical pressure upon the stomach, this subsidence at once relieves the patient from any further disposition to these unpleasant symptoms.

This falling of the uterus generally takes place gradually, so that several days pass before the patient is aware of it; sometimes it occurs suddenly, or in a short time, as in ten or twelve hours. As the head, covered by the cervix, must enter the brim, to a greater or less extent, during the above sinking, this is looked upon as a symptom indicative of a large, or well-formed pelvis; being seldom observed in cases of contracted pelvis. The sinking of the uterus is usually considered to be the result of the complete softening of the cervix uteri, with a relaxation of the uterine tissue, which permits it to expand laterally. The late Dr. Meigs considered the womb wholly passive in the matter, it being pushed downward by the action of the diaphragm and abdominal muscles. In some females, this sinking of the uterus is followed by an unpleasant sensation of weight in the inferior part of the pelvis, with an irritable condition of the rectum and bladder, occasioning frequent and ineffectual desire to evacuate these organs, with other unpleasant symptoms, and which are owing to pressure of the presenting part upon the bladder, rectum, blood-vessels, etc. These symptoms can not be relieved by treatment, though when dysury is present the patient may urinate freely, by placing herself upon her

hands and knees, with the hips somewhat elevated; tenesmus, when severe, may frequently be relieved by an injection of starch, or elm infusion, to which a few drops of Laudanum have been added, or the support of a bandage carefully applied might prove advantageous.

One, two, or three weeks previous to labor, contractions of the uterus are frequently observed, to which the names of *painless uterine contractions*, or *fibrillar contractions*, have been applied. The patient experiences a squeezing sensation in the abdomen, which is unaccompanied with pain, and which occurs at intervals; during its presence, if the hand be placed upon the abdomen, the uterus will be found hard and well-defined. They occur much sooner in primiparæ than in multiparæ, and are supposed to be sometimes occasioned by the child's motions; it is believed that these painless contractions produce gradual changes in the cervix and os uteri, before actual labor commences, and may, possibly, assist in bringing about the subsidence of the uterus.

In connection with the above symptoms, the parts become somewhat relaxed and soft; though it is very doubtful whether any relaxation of the pelvic symphysis occurs, as stated by some authors. With these are frequently other symptoms, of a minor character, as cramps in the lower limbs, swelling of the labia, increase of appetite, etc.; all of which, collectively, indicate the approach of labor. But the symptom upon which we may rely as an evidence that labor is close at hand, is a muco-serolent discharge, called by nurses and midwives, "*the show*." It is, usually, observed from twelve to twenty-four hours previous to the commencement of actual labor, and consists of a greater or less quantity of mucus, of a thin, or thick and viscid character, colorless, until labor has commenced, when it becomes mixed with more or less blood. The mucus is an exalted secretion of the follicles of the vagina, and is not to be regarded as an indication of labor, unless there be found mixed with it the gelatinous substance which had previously occupied the canal of the cervix; and the blood arises from the separation of the membranes, and the rupture of the blood-vessels which pass from the cervix uteri to the fetal membranes. According to Wigand, when the mucus is thick and viscid, it is more favorable. It evidently prepares the passages for the exit of the fetus by lubricating them. It may be proper to state here, that the *show* is frequently absent, and also, it is sometimes observed for some days previous to actual labor; but these cases may be looked upon as the exceptions to the general rule; for it is usually only when the dilatation of the os uteri has commenced, with descent of the membranes, that the sanguineous show is seen—it is, therefore, a good sign of commencing labor.

Some females suffer for a week or longer previous to labor, with a restless anxiety, a wakefulness at night, pains of an irregular character about the uterus, and a peculiar nervous irritability. Others again, especially those of nervous temperament, are attacked with rigors or tremors, of greater or less severity, but which are unattended with any feeling of cold. These rigors are usually indicative of rapid dilatation of the os uteri, and require no attention, unless accompanied with a sensation of cold. They frequently occur immediately after labor, and are sometimes so severe as to create some alarm in the minds of the friends of the patient, as well as of herself, and heating drinks are often injudiciously administered. Some warm diluent drink, as tea, and an extra covering over the patient will be all that are required. "If these shiverings be followed by symptoms of fever, this must be guarded against; if by severe pains in the head and abdomen, evidently not proceeding from the labor, then you may suspect that there is inflammation. If there be much flushing of the face, throbbings of the carotids, and the pulse high, there is reason to apprehend that convulsions may supervene. These accidents are rare, however; and when the rigors occur without the above accompanying symptoms, it is indicative that the labor will be active and its termination speedy."—*Blundell*.

Dilatation of the os uteri is frequently attended with nausea or vomiting; these are not the *causes*, but the *effects* of the dilatation, and have no weight in sustaining an erroneous impression once entertained, that nauseants or emetics favor dilatation. The only agents proper to overcome a rigid os uteri, and forward the dilating process, are relaxants. The practitioner who, in the first stage of labor, meets with a rigid os uteri, which seems disposed to obstinately maintain its rigidity, notwithstanding the strength and frequency of the pains, will observe that an attack of spontaneous vomiting is followed by a softening, relaxation, and dilatation of the os, and is therefore a **favorable symptom**. As a common rule, it seldom lasts any length of time, occasions but little distress to the patient, and needs no treatment. Occasionally it becomes very painful and obstinate, requiring the aid of the physician; a few drops of Laudanum, or of tincture of Gelsemium in a draught of Soda water, will usually prove sufficient to check it; and should constipation be present, a laxative enema must be administered. It is rarely that a sinapism is required over the epigastrium; vomiting during a *protracted* labor must not be confounded with that just referred to; it is a very unfavorable sign, and the matter ejected will be in large quantity, dark colored, and often fetid; it will be noticed under Rupture of the Uterus.

Usually labor commences with pain, but considerable progress may be made without any pain; and occasionally the patient experiences no pain until the os has become fully dilated, and the suffering attends the expulsive effort only. True labor pains are intermittent in their character, having an interval of ease between them; at first they are short and weak, with long intervals, but gradually become stronger, more frequent, with but little or no interval between them. They may be suspended by many causes, as passions of the mind, anger, fear, surprise, grief, etc.; sudden and unexpected news, or even the entrance of the physician into the parturient room, has frequently suspended the labor for hours. The administration of stimulating liquors, which is rather common with some old nurses, is very reprehensible; I have known labor to be suspended for twelve hours, by a draught of gin-sling, advised for the purpose of *easing the pains*. Anodynes, as Morphine or Opium, act in a similar manner; a full dose of either will overcome uterine contraction, and may result in the suspension of labor for hours.

There are two kinds of pain recognized at the commencement of labor, which are termed *true* and *false pains*, and it is of importance to the patient, as well as to the reputation of the physician, to be enabled to discriminate between them. *True pains* are regularly intermittent, and are confined to the uterine region, and during their continuance, if the hand be placed on the abdomen, over the uterus, it will be found to contract and grow harder with the pain, and to become softer as the pain passes off; upon making a vaginal examination, the os uteri will be found to contract during the presence of a true pain, with a protrusion of the membranes, and to dilate during its absence.

False pains, are more frequent in first pregnancies than in subsequent ones; they are irregular or constant, and exert no influence whatever upon the uterus or os uteri, though contraction of the abdominal muscles may attend them, and which it is important not to mistake for uterine contractions. They are very apt to harass the patient during the night, and disappear through the day; and may be dependent upon rheumatism or congestion of the uterus, intestinal irritability, constipation, overfatigue, etc., and are sometimes attended with febrile symptoms.

True pains, commence generally in the back, pass around to the front of the abdomen, as far down as the groin, recur at regular intervals, gradually increase in frequency and power, and occasion contractions of the uterus and os uteri, and protrusion of the bag of

waters. *False pains*, usually commence in the neighborhood of the fundus, have a limited extent, are irregular, spasmodic, often quite sharp, and exert no influence on the uterus or os. There appears to be a disagreement among obstetricians as to the order of uterine action, some believing it to commence in the os uteri and from thence to pass to the fundus, while others assert that it begins in the fundus, passes in an undulate manner to the cervix, and then returns to the fundus, the uterus being firmly contracted all this time. As to the manner in which peristaltic uterine action occurs, Leishman cites Wigand, who has taught, in so far as the contractions of labor are concerned, as follows: The earliest contractions always take place at the neck, which grows tense. From this point the vermicular action extends gradually upward in the direction of the fundus, from whence it again returns toward the os, obvious mechanical advantages being attendant upon this method of action; my own observations lead me to coincide with the latter opinion.

To remove false pains, we must endeavor to learn their cause; if they be owing to intestinal irritability, or constipation, a mild purgative, or a purgative enema will answer; if from overfatigue, rest must be enjoined, and an opiate may be administered, or, what is better, Sp. Tr. Pulsatilla or Valerian; if from rheumatism, the compound powder of Ipecacuanha and Opium, with an occasional laxative, will remove them, or specific tinctures of Gelsemium, Macrotys and Aconite. Ordinarily a few doses of compound powder of Ipecacuanha and Opium (Dover's Powder) will give relief. If the patient is annoyed by a return or a continuance of the pains, I would recommend half-teaspoonful doses of the Parturient Balm three times daily. This preparation has a direct and kindly action on the uterus, and satisfactory results will follow its administration.

I have met with many cases, in practice, where the pains were sharp, regular, occurring at short intervals, with dilatation of the os to nearly the size of a silver half dollar, and everything indicating a speedy labor; when, after waiting a few hours, the pains ceased, and did not recur again for several days; the longest time I have observed to pass in such cases, before the re-appearance of labor, was two weeks; I do not pretend to account for these anomalies.

Labor has been variously classified by different authors, for the purpose of facilitating an acquaintance with it. The arrangement which I have adopted, is one followed by several recent writers, and

will be found fully sufficient for all practical purposes; it divides labor into four classes, viz.:

1. *Natural labor*, in which the fetal head presents, and where delivery is effected within twenty-four hours, without the aid of any artificial power.

2. *Difficult labor*, also called *lingering*, *tedious*, and *protracted*, in which the fetal head presents, but where labor continues beyond twenty-four hours, and may require some medicinal, manual, or instrumental assistance.

3. *Preternatural labor*, in which some other part than the head presents, where there is a prolapse of the umbilical cord, or a plurality of children.

4. *Complicated labor*, in which some serious accident occurs, not connected with the presentation of the fetus.

From its commencement to its termination, *natural labor* is one continued process, marked, however, by certain peculiarities which have led to a division of it, among obstetricians, into several parts or stages. The most usual, and, probably, the most natural division, is that of Denman, who describes labor as consisting of *three stages*. The *first stage*, extending from the commencement of labor to the full dilatation of the os uteri; the *second stage*, occupying the period between the dilatation of the os, until, and including, the birth of the child; and the *third stage*, including the delivery of the placenta. The time which each of these stages occupies varies with different patients, according to circumstances.

In the FIRST STAGE OF LABOR, the *stage of dilatation*, the os uteri will, at an early period, be found looking toward the sacrum, and will gradually approach toward the center of the brim as labor advances. The pains which are present during this stage, are of a peculiar character, and are variously described by patients, as "grinding, cutting, or sawing." They are entirely confined to the uterus, producing no sensible change in the position of the fetus, but influence the condition of the os uteri, dilating it that the head of the fetus may pass through. These are termed the *preparatory pains*, and the rapidity with which dilatation ensues, very much depends on their force and frequency. Generally, it proceeds more rapidly during the latter half of the first stage, and is effected more slowly in primiparæ than in multiparæ.

These pains commonly commence in the back, extend to the loins, from thence to the front of the abdomen and pubes, and terminate in

the neighborhood of the groins, or upper part of the thighs. Sometimes females are able, especially in the first part of this stage of labor, to conceal these pains, but usually they cause much suffering, obliging the patient to suspend for the time whatever occupation she may be engaged in, and forcing from her moans, or a short and fretful cry. The pains are not attended with any bearing-down or expulsive efforts, and the practitioner should be careful to caution the patient against any of those voluntary bearing-down efforts during the preparatory stage of labor, which are so often unwisely advised by ignorant nurses and midwives. As the pains proceed, they increase in severity, and last for a longer time, having shorter intervals between them, and when absent, the female manifests a certain degree of restlessness and uneasiness; the pain in the back may sometimes be relieved by pressure, but not always, and when this is the case, the matter should be left to the care of the friends, and not to the practitioner, who must be careful not to fatigue himself at an early period, lest he be unable to afford more important aid at an advanced stage, should it be required. Sometimes each pain is preceded by a slight nervous tremor or shivering, and it is not uncommon for nausea and vomiting to attend the whole of the first stage. The vomiting is beneficial, in consequence of its removing crude and indigestible substances from the stomach, when they are present, and also from the relaxation of the os uteri, which is certain to accompany it. When it is very severe and annoying, I have frequently checked it by administering a hot drink; the common tea or hot water may be used. Frequently the female becomes irritable, restless, impatient or despondent, and may say or do things which are extremely unpleasant to the physician, but which good sense will teach him to pass by in a pleasant, friendly manner, at the same time endeavoring to console and encourage his patient. By an attention to the moans or peculiar cries of the female, her expressions, and respirations, the practitioner can frequently determine the first from the second stage of labor. Respiration will be free, or if the breath be suspended, it will be for a few seconds only, without any straining or bearing-down efforts, and which is the reverse of the second stage.

Generally, there is no increase of the temperature of the surface, and no perspiration, especially during the first half of this preparatory stage; and the pulse is seldom quickened until the second stage. Hohl has remarked, however, that during the first part of a pain, the pulse will be found more frequent, then remain stationary for a moment, and afterward subside into its natural action. Upon auscultation, just as a pain is coming on, there will be heard, a short, rushing

sound, apparently proceeding from the liquor amnii, and which may, probably, be caused in a degree by the fetal movements, or the muscular contractions of the uterus, at the same time all the tones of the uterine pulsations become stronger and more distinct; sounds also, are heard which were not noticed before, especially those of a piping, resonant character, and which seem to vibrate through the stethoscope. As the pain reaches its maximum, these sounds become gradually dull or altogether inaudible, and return with the decline of the pain, resuming the original character during the intervals between the pains.

If we examine through the abdominal walls, during the pains, the body of the uterus will be found hard and rigid, and thrown forward, so as to place its long diameter in correspondence with the axis of the superior strait, and without which the labor would progress with much difficulty; as the pain ceases, the organ relaxes. An examination per vaginam will detect the os uteri high up, looking toward the promontory of the sacrum, and more or less dilated; most commonly, it will admit the end of the index finger, at the commencement of labor. If it be much dilated, each pain will cause a protrusion of the membranes into the vagina, which is called the "bag of waters"—and the presenting part, if it be low down, will be found to *ascend* during each contraction, but will resume its original position as the pain subsides.

This ascent of the head is due to the liquor amnii, which, being compressed downward by the uterine contraction, must exert an action that will cause any body floating in it to ascend, in accordance with the laws of hydrostatics.

The *bag of waters* is the name given to that portion of the membranes which protrudes through the os into the vagina during a pain. Its shape is generally round or elliptical, and sometimes elongated, like a sausage, and which is supposed to be owing to the nature of the presentation. During a pain it is hard, and must be carefully touched, as it frequently becomes ruptured from the slightest cause; as the pain disappears, it becomes lax and wrinkled, and recedes into the uterine cavity. It undoubtedly assists in the dilatation of the os uteri. It usually ruptures at its dependent extremity, and when the rupture occurs, that portion of the liquor amnii, situated between the fetal head and the membranes, escapes, the head descends and prevents the too rapid flow of the remainder, and delivery is soon effected. Sometimes the rupture occurs high up, the waters escape gradually, and the head being in immediate contact with the membranes, the child may be born with a *caul*, especially when the

membranes in contact with its head remain unbroken. Rupture of the membranes may occur at any period of the first stage of labor, depending on their power of resistance; if it should happen at an early period, it will delay the delivery, and may cause a difficult labor. Sometimes it is not ruptured at all, but the fetus is born enveloped in the membranes, yet such cases are rare. It is important for the practitioner, as a general rule, to retain the membranes entire, if possible, until complete dilatation of the os uteri has been effected.

The *os uteri* may present several variations in its character during the first stage of labor. Thus, it may be found thick, soft, spongy, moist, dilated, or if not dilated, relaxed, and dilatable, which is a favorable condition; or it may be thick, hard, rigid—perhaps likewise, hot, dry, and tender, feeling somewhat like cartilage, and which is an unfavorable condition, generally indicating a difficult labor. Toward the latter part of the first stage of labor it may be found soft, moist, cool, sensitive to the touch, but not painful, and so thin that the presenting part of the fetus can be distinctly felt through its substance; this is likewise a favorable condition. Or, it may be thin, hard, rigid, perhaps tender when touched, with its edge tightly embracing the presenting part of the fetus, like a piece of cord; this is an unfavorable condition, indicating, as with the former instance of rigidity, a difficult labor. Rigidity of the *os uteri* will be treated of hereafter.

To return to the progress of the preparatory stage of labor; the *os uteri* becomes thinner and softer as the labor advances, its dilatation continues to increase, and usually, the head of the fetus passes the superior strait, occupying a considerable portion of the pelvic cavity, until complete dilatation having been effected, the *os uteri* is wholly effaced, and the head passes through into the vagina. Sometimes, however, the anterior lip may be felt, thick and somewhat œdematous, between the fetal head and the pubis, requiring no interference, unless the progress of labor be impeded by inefficient pains, but which is more commonly encountered during the second stage. Generally, if the membranes have not previously given way, they rupture at this moment, and the liquor amnii escapes with a gush. Sometimes they do not rupture but pass through the vagina and its orifice, upon the external parts, which they aid in dilating. With the full dilatation of the *os uteri*, which may be accomplished in from four to eight hours, the first stage of labor terminates. The duration of this stage, however, varies with different women, and frequently with the same women in different labors, and almost always occupies more time with *primiparæ*.

The os uteri having become fully dilated, the **SECOND STAGE OF LABOR** the *propulsive* and *expulsive stage* now commences, between which and the first stage, especially if the membranes have ruptured, there is usually a short interval of freedom from pain; and with some women, several hours of rest will follow without any pain.

A new order of things is now presented, the pains become much stronger and more perfect, and change from the grinding character to that of the expulsive, and it is only in this stage that the accessory powers of the diaphragm and abdominal muscles are called into action—the rectus abdominis, the external and internal oblique, and the transversalis. The action of these muscles is rarely witnessed until the os uteri has retracted over the head, and then it commences powerful and continued. The patient fills her chest with air, and fixes it as a fulcrum for muscular exertion by closing the glottis, which prevents the escape of the air; she then grasps any object near her for support, fixing the feet firmly upon some immovable point, and forcibly bears down. Any noise or outcry is usually suspended until the termination of the pain, the breath being held until it is over; though, sometimes when the pain continues for a long time, a kind of half-breath with a short cry will be uttered once or twice during the pain; apparently for the purpose of more firmly renewing the condition necessary for powerful bearing-down efforts. The tone is not of the fretful, moaning character of the first stage, but is of a straining character, sometimes terminating in a short cry and gasping for breath, and affords a good test for the practitioner to determine the second stage from the first. Between each pain there is a perfect condition of repose, and should this stage be much prolonged, the patient will frequently doze during the intervals. The dozing is owing to fatigue, and partly to the congestion about the face and head, the result of the suppressed breathing, and requires no interference, unless it be excessive and attended with severe pain in the head, which are the premonitory signs of convulsions.

During the presence of a pain, and while the patient is so powerfully exerting herself, the heat of the skin becomes increased, also the frequency of the pulse, the eyes are bright, profuse perspiration takes place, and during the suspension of respiration, the vessels of the head and neck become congested from an arrest of the circulation, the face being florid and sometimes purple. The patient manifests much agitation, though she bears her sufferings with more patience and cheerfulness than in the first stage, and appears to have changed her fretful or despondent condition to one of courageous determination. Vomiting

occasionally occurs in this stage also, and is usually a favorable symptom, unless it be dark, greenish, and fetid, with fever, suspension of pains, and tenderness of abdomen, when it is a very unfavorable indication.

Upon making a vaginal examination, the head of the child will be found in the pelvic cavity, each pain forcing it toward or upon the perineum; the pressure exerted upon the head causes a wrinkling of the integuments, and overlapping of the parietal bones; and if the external parts are unyielding, the labor being protracted, a tumor, *caput succedaneum*, will form under the scalp, owing to an effusion of blood into the loose cellular membrane between the bones and integuments. The head most usually lies in an oblique or diagonal position in the pelvis, having the occiput looking toward the left acetabulum, and the forehead to the right sacro iliac symphysis, the most dependent part being the vertex. As the head is forced onward by the pains, the soft parts of the canal through which it is passing become gradually dilated, rotation of the head ensues, the perineum becomes thin and distended, and the occiput appears between the labia. On the subsidence of the pain the head recedes, and the external parts resume their natural appearance; but on the return of another pain, the head is thrust still further down, the distension of the perineum is increased, the anus projects, and probably there may be, at this time, a discharge of the contents of the rectum, as well as of the bladder. The patient suffers most intensely, as manifested by her loud, piercing cries, or by deep, suppressed groans. As the pains continue, the distension of the perineum increases, it becomes thinner, tense, elongated, and widened, the vulva begins to unfold, and the head advances to the external labia; with the subsidence of the pains the elasticity of the perineum forces the head to recede upward, to be again thrust forward upon their renewal. Finally, all resistance is overcome, a succession of strong, expelling pains, called *double pains*, because they follow each other so rapidly, that a new one commences before the previous one has terminated, causes the head to emerge from the vulva, while, at the same time, the female utters a sharp, agonizing shriek, which is followed by panting and sobbing, and, after a short period of repose, the remainder of the child is delivered. As soon as the head is born the child commences respiring and crying, or if this does not immediately occur, it will as soon as the mucus in the mouth is removed by means of a finger.

Dilatation of the perineum, like that of the os uteri, is accomplished in different cases, at various periods of time, sometimes requiring several hours before it is completed, especially in first labors, and as often

requiring only a few pains. Its distension is so great during the passage of the head and shoulders as to endanger its laceration, which must be carefully guarded against by the practitioner.

After delivery of the child, the female is relieved from all her suffering and anxiety, and enjoys a greater or less period of repose, until the **THIRD STAGE OF LABOR** or, *supplemental stage*, commences; though, usually, she will be much excited or exhausted, with a rapid pulse, flushed countenance, and profuse perspiration. The pains are again renewed, but with less severity than before, and after one or two have been experienced, the placenta and membranes are expelled. Sometimes the placenta is delivered with the same pain that expelled the child, but usually from a few minutes to half an hour or longer, elapses before this takes place; as the placenta is not, commonly, completely detached before the birth of the child.

The delivery of the placenta is usually followed by a variable amount of blood, not to exceed a pint in normal cases; and frequently a shivering, with chattering of the teeth ensues, which, however, is not the result of cold. When the placenta is not delivered within an hour after the birth of a child, it must be managed as a *retained placenta*. If the distance between the perforation in the membrane, through which the fetal head passed, and the placenta, be ascertained after their expulsion, it will give us the exact distance between the placenta and os uteri, and thus enable us to estimate the situation of the placenta in utero.

After the secundines have been expelled, the uterus contracts, and gradually returns to its normal, unimpregnated condition, and it may be felt through the abdominal walls, directly above the pubic symphysis, soon after the delivery, imparting the sensation of a hard, round tumor, somewhat like a large ball. For a few days subsequently, the exposed vessels of the uterus, at the placental site, discharge a sanguineous fluid called the *lochia*, which changes to a greenish, or a creamy hue, having a peculiar odor, and which gradually disappears as the uterus resumes its non-gravid state.

Professor Haughton, who has bestowed considerable attention upon the subject, concludes, from his investigations, that the involuntary or uterine effort during labor amounts to 3.4 pounds to the square inch, while the voluntary or abdominal force equals 38.6 pounds to the square inch, giving a total of 42 pounds. Now, if it be admitted that the diameter of the fetal head is $4\frac{1}{2}$ inches, we have a propelling power, exerted upon its surface, during uterine action, equivalent to 593 pounds. And as the voluntary force exceeds the involuntary more

than ten times, it may readily be seen how the progress of labor must be impeded by destroying the will power under the influence of anæsthetics. It will, however, become necessary in some cases of nervous patients, to allay the suffering, to a degree, by allowing a few inspirations of chloroform during the pain, withdrawing it during the interval between the pains, and so continue during the last throes of the second stage. It is very probable, however, that the real force exerted is less than that named above, though we are aware it is very great from the difficulty experienced, if not impossibility, of introducing the hand into the uterine cavity during a pain, from the influence of these pains upon the accoucheur's hand when within this cavity, as well as from the force required in delivering the head with forceps, in the absence of pains, and when the head is in the upper part of the vagina.

CHAPTER XXV.

MANAGEMENT OF NATURAL LABOR.

It must be remembered by the practitioner, that labor is not a case of sickness, but a function natural to females, for which as complete provision is made as for any other function of the system; and all that he can do is, to carefully witness and superintend its progress, without any improper, or uncalled for interference. Indeed, the maxim of every obstetrician should be, "allow nature to pursue her own course, without any officious intermeddling." But, sometimes, as is the case with other functions, this of labor may fail from certain causes, and it is only in these failures, when the natural powers are insufficient to safely finish the labor, that the aid of the practitioner is demanded; and it is his duty to thoroughly inform himself relative to all the circumstances which may require his assistance, as well as the means of removing, or overcoming them, in the safest, gentlest, and most successful manner. In a natural labor, nothing further is required, after having satisfied one's self that the presentation and condition of the parts are normal, than to patiently await the expulsion of the head, receive it and the rest of the child, tie and separate the cord, and remove the placenta. But as the young physician, especially, may be at a loss how to proceed in the management of a case of this kind, I shall lay down a line of conduct, an attention to which, I trust, will be found advantageous; for without

a knowledge of the proper course to be pursued, a very slight interference of an improper character, may convert a simple case of labor into a protracted or even dangerous one.

Having been engaged to attend a female in her confinement, the physician should endeavor so to arrange his business, that, at the expected time, he can readily be found by those who are dispatched to summon his presence to the parturient chamber. He should obey the summons as promptly as possible, not only that he may secure the confidence of the patient and her friends, by displaying a readiness, cheerfulness, and willingness to accord his services, but more especially that he may be in time to rectify any accidents which may occur, and to which all females are liable during parturition—as, presentation of the superior extremities, uterine hemorrhage, and (in cases where delivery takes place rapidly, with but a few pains), an encircling of the neck of the child by the umbilical cord. If he reside in a city, it is hardly necessary to take along with him any medicines or instruments, lest he be tempted to needlessly administer the one, or rashly employ the other; beside, when either are required, they can readily be obtained, and in sufficient season. Perhaps a flexible male catheter, and some compound powder of Ipecacuanha and Opium, may be the only exceptions to this rule. But with a practitioner in the country, who frequently has to attend patients many miles distant from his office, and where the delay occasioned by sending for the requisite articles may prove fatal to his patient, the case is entirely different. He should take with him, his instruments, and several vials, containing compound powder of Ipecacuanha and Opium, Ergot, Macrotys, some preparation for uterine hemorrhage, as tincture of Cinnamon, and tincture of Gelsemium, or compound tincture of Lobelia and Capsicum. He should likewise include an anæsthetic, as Chloroform, Ether, or a mixture of the two. The use of any of these may not generally be needed; but if one patient among fifty is saved, or benefited, the physician will be fully repaid for his attention to these patients.

On reaching the patient's house, he should have **his arrival** made known to her before he enters the room, as it is frequently the case, especially in first labors, that the sudden introduction of the physician has caused a suspension of the pains for some time; beside, the female may wish to have her room arranged before the entrance of the physician, or she may be very averse to his presence, requiring some time for her friends to remove her scruples. But this can not always be done, for with the poorer classes, who occupy but one room, he is

obliged to be ushered into the patient's presence at once, and his good sense will teach him how to conduct himself in such cases. Unless from the general symptoms and appearance of the patient, he suspects the second stage of labor to be at hand, or where symptoms are present which demand his immediate attention, it will be proper to remove any embarrassment under which she may be laboring, and allow her to collect herself, by entering into conversation with her upon any subject foreign to her situation. Should the pains come on, while thus engaged, if they are of trifling importance, the practitioner may leave the room, or occupy himself in conversation with some of the friends present, and especially with the nurse, from whom he may gain information as to the condition of the bowels, bladder, and previous character of the pains. But if the pains are frequent and active, or occasion much complaining, he may then inquire of the patient, herself, in a *low tone* of voice, relative to these points; and he may also form some idea of the probable advance of the labor from the character of the pains. He should likewise interrogate as to the general health of the patient, and with multiparæ, the character of previous labors; ascertain the present condition of the pulse, skin, and tongue, and make such other inquiries as may be necessary.

If the bowels are in a constipated condition, in the early part of the first stage of labor, a mild cathartic may be administered, as castor oil, or, whatever unobjectionable purgative the patient may prefer; but if the labor has advanced to nearly the commencement of the second stage, or if this stage is already present, a laxative injection should be used in preference, as being more apt to cause a speedy evacuation of the rectum. And at all times, during the labor, whenever the female desires to evacuate the bladder or rectum, the practitioner should leave the room; indeed, it is proper that he should request the patient, through the nurse, or some friend, not to retain these discharges, but to have him notified, whenever they are called for, while he is in the room, that he may retire.

As soon as it is deemed necessary to make a vaginal examination, *and which should not be delayed for too long a time*, the request must be made of the patient, through some friend or the nurse; the object of such an examination is usually understood, but where it is not, an explanation should be given, stating that it is "for the purpose of learning the condition of the parts, the manner in which the child is coming, and to know that everything is right to insure a safe delivery." Sometimes, an objection is made, especially by those in their first labors, but by a firm and gentle course, representing to the patient,

that her own safety, as well as that of her child, may depend upon an early examination, the objections will generally be overcome. Should the female be pettish, or fidgety, and notwithstanding these representations, persist in her objections, declaring that she will never submit to an examination, and perhaps using harsh words to the physician, all that he can do, will be to wait patiently until the pains have subdued her caprices and antipathies, when the examination will be cheerfully granted. Generally speaking, however, there will be found no difficulty in obtaining the consent of the patient, if the request be delicately made through a third (female) person.

One other reason for requiring an early examination, is, that the accoucheur may not be detained for hours, waiting upon *false pains*. I have known several young practitioners, who, having been misled by these pains, and a delicacy as to insisting upon a vaginal examination, have been deprived of their rest for many hours, and were only made aware of their error, when the loss of confidence in their abilities determined the patient to send for another medical man, who at once explained the cause of the delay. Truly, a mortifying situation for any one to be placed in! Again, it may be the case, that no pregnancy exists.

It is not only highly proper, but it is a positive and imperative duty of the practitioner, to conduct himself, throughout the whole course of parturition, with firmness and kindness, but especially with decorum, using no language, and manifesting no actions which might offend the delicacy or modesty of the most fastidious. It will, therefore, be proper for him to observe the persons who are in the room, previous to making an examination, prudently dismissing all but two or three, whose presence as assistants may subsequently be needed; and unmarried females should by no means be allowed to remain, as they can render but little assistance, or afford but a small share of consolation to the patient. The presence of relatives should always be preferred, and if the husband remains it is an attention which many men neglect to pay to their wives at this period, and should be rather encouraged than condemned; his presence will tend to check the obscene language of the filthy-minded, should any such be present. No pure-minded nor well-meaning practitioner would hesitate for a moment to perform all the necessary duties of his profession in the presence of a husband, which he would do in his absence, or in the presence of females. A servant in attendance, to do the errands that may be requisite, will be found a valuable acquisition, when one can be had.

Previous to the examination, the physician must see that the nail of the finger to be introduced into the vagina is short, otherwise, it might, by coming into contact with the tense membranes, at this early period, rupture them, and occasion serious results. Indeed, a physician with long nails, and kept in a state of uncleanness, is not a very proper nor desirable object for the parturient chamber. Filthiness of person, in any respect, implies filthiness or carelessness in practice.

There are various positions recommended for placing the female during an examination. Sims' position, in the *early* part of labor, is the preference with many; directing the patient to lie on the bed, upon her left side, her back being toward the physician, with the hips near to the edge of the bed, and the knees drawn up toward the abdomen, and separated a little by a pillow or cushion placed between them. Other positions may be advised, as to lie upon the right side, or upon the back, in which case the right or left hand may have to be used; but an accoucheur should accustom himself to examine readily with either hand. I usually allow the patient to take the position, in the beginning, that seems most comfortable to her. I find it more convenient, however, if she remain on the back, to pass the hand, in making the examination, beneath the flexed limb, etc. The position having been taken, the index or middle finger is to be annointed with lard, sweet oil, pomatum, or other unctuous substance, both for the purpose of an easy introduction and that the parts may not be readily irritated by its presence, as well as to guard against the contraction of disease, should any be present. A cloth, or napkin, should be at hand, as likewise a basin of water, soap, and towel, for the subsequent washing of the hands. In all cases, when possible, never make a vaginal examination unless in the presence of a third person.

Having loosely thrown a sheet over the patient, for any exposure of her person is unnecessary and reprehensible, the practitioner will seat himself by the bedside in such a manner as will admit a ready introduction of the finger into the vagina, that is, with his face looking toward the head of the patient, and his side to the side of the bed next the patient. As simple as this direction may be, an error or a hesitation as to the proper mode of placing the chair, may destroy the confidence of the patient or her friends. During the presence of a pain is the period generally advised for the introduction of the finger, hence, it is frequently termed "taking a pain." The sheet is now to be raised, but without any exposure of the female, and the examining hand of the accoucheur passed quickly upward toward the vagina; the finger is to be carefully and slowly introduced along the posterior

commissure, and into the vagina, carrying it along the posterior wall of this canal, until its upper extremity is reached; then, by bringing the point of the finger toward the symphysis pubis, the os uteri will be felt. The practitioner will be very careful, in this examination, not to introduce his finger into the rectum instead of the vagina, a very mortifying accident, and one which I have known to occur in the early obstetric practice of some young medical gentlemen; it will not be likely to happen, if presence of mind is retained, with a freedom from restraint and bashful diffidence. The advice to envelop the arms in a towel, or cover them with oil-silk sleeves at this early examination, is altogether unnecessary.

In this first vaginal examination, there are several conditions to be ascertained, in effecting which, the physician must proceed carefully and cautiously, and without undue haste; nor must he remove his finger, until he has *positively satisfied himself* in relation to the more important symptoms. A great fault with young practitioners, is a species of delicacy or bashfulness, which, although highly commendable, is very apt to prompt them to make a hurried and unsatisfactory examination. The knowledge to be acquired is: 1, whether pregnancy exists; 2, whether the woman be in labor, and the progress it has made; 3, which is the presenting part of the child; 4, whether the membranes are entire, or have ruptured; 5, the condition of the os uteri, vagina, perineum, and pelvic diameters; and the finger should not be withdrawn until the pain has passed away, and a sufficient part of the succeeding interval has been occupied in making the examination thorough and satisfactory.

The recommendation to ascertain the existence of pregnancy in a female who declares herself pregnant, that she has felt the motions of the child very sensibly, and that she is suffering from labor-pains, may, at first sight, appear rather absurd, but when we reflect that instances have not unfrequently occurred, in which the physician, misled by the professions of the woman, who was herself deceived in regard to her condition, has remained in attendance for days and even weeks, until the discovery was made that she was not even pregnant, rendered him the mark for the jest and ridicule of all who heard of his exploits; this caution will be deemed very proper and essential. Many circumstances may occasion an enlargement of the abdomen, as flatulency, an effusion of fluid in the peritoneal cavity, tumors, etc.; and a near resemblance to labor-pains may be occasioned by spasmodic action of different muscles, leading the female to believe, not only that she is pregnant, but that labor has actually commenced. It will, therefore, be readily understood, that the accoucheur can place no

reliance upon any other source than a correct, personal examination. The means by which pregnancy may be determined have already been given in preceding pages; but it may not be amiss to call attention to a few matters relating thereto. In many instances, the hand placed on the abdomen for the purpose of detecting the contractions of the uterus during the pains, the condition of the abdomen as to its softness or hardness, and elasticity, the extent of the swelling, and its shape, will frequently decide the question; but if there still remains any doubt, the vaginal examination will be more likely to solve it. There will be found, if pregnancy be absent, the protruding, unexpanded cervix, with a close, undeveloped os uteri, and the uterus when poised on the end of the finger, will, if not diseased, be found small, light, and very movable; but, if pregnancy be present, and labor commencing, the cervix will be found expanded, and the os uteri fully developed, and perhaps sufficiently open to allow the finger to enter, and detect the presence of the fetus. When doubt still remains, ballottement, auscultation, and the means previously recommended should be resorted to.

The female may be pregnant, but not in labor, and this is to be determined by the rules given in the previous chapter. This is a point that must, as well as the preceding, be fully solved, or else the practitioner may subject himself to much ridicule by waiting upon "false pains" instead of true ones, a circumstance which has, unfortunately, happened more than once in practice. Labor may be detected by the true pains hardening the uterine globe; by the os uteri contracting during the presence of a pain, and dilating during its absence; by the bag of waters being tender, tense, and protrusive during the uterine contractions, and becoming soft and relaxed in their absence, receding within the uterine cavity.

During the presence of a pain, a careful examination should be made to ascertain the effect produced by it upon the os uteri; whether this is high up in the pelvis, or low down; whether it is thick or thin, soft, and yielding, or thick, rigid, and unyielding; and in doing this, no pressure should be made upon the membranes, which are generally tense and thin during the presence of pain, lest they rupture, and a natural labor be thereby converted into a protracted one. Upon the cessation of the pain, as soon as the os uteri has relaxed, and the membranes have collapsed, *and not before*, cautiously introduce the finger within the orifice of the os uteri, to ascertain whether the head presents, and should a pain come on, while the finger is within, gradually remove it as the membranes protrude, without exerting any pressure upon them, and re-introduce it on the subsidence of the pain and col-

lapse of the membranes. The head may readily be known by its rounded form, its peculiar hardness, and its sutures. If the hard edges of the parietal bones can be felt along the sagittal suture, there can be no difficulty in determining the presentation. The endeavor to ascertain the *position* of the head at the commencement of labor, or previous to the rupture of the membranes and completion of the first stage, is unnecessary, and exceedingly improper, and endangers the rupture of the membranes; it is sufficient to *know positively that the head presents*, and this information should always be obtained, before withdrawing the finger, for it quiets any fear or anxiety on the part of the practitioner, who knows, that nature is most generally capable of overcoming or rectifying any improper positions of the head without artificial interference. "Any attempt to determine in which of the numerous positions described by some authors, the head is placed at the brim of the pelvis, would only endanger the rupture of the membranes, and disturb the regular order observed by nature in the process. Indeed, I can not discover what benefit could result from knowing during the first stage of labor, provided you can touch the vertex with the point of the finger, in which of the six or eight positions of Baudelocque and other foreign authors, the head is placed, The importance attached by some authors to a knowledge of these positions, some of which are wholly imaginary, has probably arisen from *the dangerous practice of employing the long forceps before the os uteri is fully dilated*, and before the head has passed into the cavity of the pelvis. At this early stage of the labor, *no instrument of this description can be safely used*, and if the operation of turning were required, the position of the head would have no influence upon the method we would adopt in turning. Be sure that the head presents before you state this to the nurse or patient, as they will not soon forget your mistake, if it should turn out to be a case of nates presentation."—*Lee*.

Should any other part present than the head, the practitioner, has by the examination, gained information which will enable him to give the necessary assistance at the proper time; but by neglecting to obtain this knowledge, he is highly culpable, as he not only runs the risk of exposing his patient to much unnecessary suffering, but may actually endanger her life, that of the fetus, or the lives of both. The method of determining face, nates, and other presentations, together with their treatment, will be described hereafter. I may state here, that if the index finger fails to reach the os uteri, or feel the presenting part, two fingers, the index and middle, should then be introduced, for it is imperative that the practitioner should decide the presentation at as early a period as possible. It is frequently the case, especially in

females of irritable habits, that the most cautious introduction of the finger within the os uteri will occasion the uterus to contract; and in nearly all patients, the excitement produced by the finger being needlessly moved round to discover the *position* of the presenting part, will induce contractions, which may, more or less suddenly, force the membranes against the finger and rupture them, occasioning a premature discharge of the liquor amnii, an accident always to be dreaded in the early part of the first stage of labor. When the membranes are *entire*, the protruding bag of waters will be felt during the pain, and there will be no dribbling away of the liquor amnii; if they be *ruptured*, the presenting part can be more readily detected, the hairy scalp puckering up during the pain, and becoming smooth and even, when it subsides; while, on the contrary, the membranes are smooth and tense while the pain is on, and lax during its absence.

The finger being withdrawn from the os uteri, the dimensions of the pelvis and its conditions, should then be explored, for the purpose of determining the probable character of the labor. The point of the finger should be carried toward the promontory of the sacrum, as explained when describing the pelvic diameters, and if this be not touched, the space is ample enough for the passage of the fetus, and if deemed necessary, the other diameters may be ascertained by the rules heretofore given. The condition of the soft parts, as to whether they are hot or normally cool, dry or moist, soft and yielding, or hard and unyielding, should also be observed—the finger should then be withdrawn, wiping it with a napkin, while still under the sheet; after which, the hands may be washed.

As soon as the examination is finished, the patient and her friends, being naturally anxious to know whether everything is right, will interrogate the physician relative thereto. This is a very delicate position for him to be placed in, for if the reply, or opinion expressed, prove incorrect, the confidence which the parties repose in him, will be at once lessened or altogether destroyed, and another physician may be sent for; beside which, it may give rise to some apprehensions on their part, that difficulty or danger in the case exists, not recognized by the medical attendant. Consequently, a reply to such interrogations should be very guarded; the physician should never permit himself to be betrayed into the expression of a positive opinion on this subject. When the head presents, and everything appears to be in a favorable condition, he may state this, and add, that if no unforeseen circumstances occur, and the labor progresses uninterruptedly, she will, *probably*, be delivered by such a time, naming the longest possible time suggested by the examination; and if delivery is effected previous to

this time, it will prove anything but a disappointment to the patient, and will occasion no doubt of the accoucheur's skill or acquaintance with his profession. The reasons for such a course are sufficiently obvious; for it frequently happens that a labor which commences rapidly and with a prospect of speedy termination, becomes protracted during its latter part; and one that has a slow and tedious beginning, may advance with rapidity during the second stage; beside, many circumstances may transpire during the progress of labor, which may convert it into one of a protracted and even dangerous character. By remembering the following points, which have been laid down by accoucheurs, a pretty accurate estimate as to the duration of labor may be formed, when not interfered with by unexpected accidents:

1. First labors are commonly more tedious than subsequent ones.
2. Labor advances more rapidly where the pelvis is of large dimensions than where it is small.
3. In proportion to the softness and yielding of the soft parts, will be the rapidity of the labor.
4. The duration of labor is always modified by the character of the pains.
5. Labor will be accomplished at an earlier period when the os uteri is dilated, or thick, soft, and dilatable, than when it is thin and firm, even though somewhat dilated.
6. A soft and slightly dilated os uteri, moist and relaxed condition of the soft parts, and regularity in the pains, are signs of a speedy delivery. When these symptoms are present, and the os uteri is dilated to a size corresponding in diameter to that of half a dollar, most accoucheurs consider it improper to leave the patient, especially if it be in the night—and which will be found a good general rule to adopt in practice.
7. Labor will be rapid where the vagina is large and yielding throughout its whole extent; but will be slow where it is small and unyielding. "If the entrance of the vagina is small, the neighboring parts cool, dry, inelastic, and as if tightly drawn over the bones; if the finger, in spite of being well oiled and carefully introduced, produces pain upon the gentlest attempt to examine, we may expect a tedious and difficult labor."
8. When the upper portion of the vagina is well dilated, and its lower portion is rigid and contracted, the labor will be rapid during its first half and protracted afterward; and *vice versa*.
9. Labor is almost always tedious in primiparæ of advanced years.
10. Notwithstanding all the above points, unexpected changes may occur which will materially alter the character of the labor, and hence

the necessity of expressing an opinion, as to the duration of labor, with a cautious reserve; for "no one can know beforehand, when a labor shall be terminated," and no good practitioner ever makes prognostics. Should the examination, at any time during the first stage of labor, discover rigidity of the parts, it must be treated as described under *difficult* or *protracted* labor. If the breech, an arm, or any other unusual part presents, it should be made known to the nurse, or some friend, *but not to the patient*, and the proper means should be pursued, as hereafter laid down.

The examination being over, the condition of the patient's bowels and bladder must be attended to, if this has not been done previously, using the catheter to evacuate this latter organ if required; and it must be recollected, that these are essential and necessary measures to insure a safe and speedy delivery. Now is also the time to make the proper arrangements for the delivery, as preparing the bed, and getting in readiness the ligatures, scissors, bandage, etc.; an attention to these little but very necessary matters, serves to secure the confidence of the patient and her friends, a very important desideratum in obstetric practice. The adjustment of the bed is usually attended to by the nurse, still it is requisite for the practitioner to understand the method of doing it, as he will frequently be called upon to give directions in relation thereto. A cot, hair mattress, or straw mattress may be used, but by no means a feather bed; and, if the patient have but the one feather bed, it must be removed or rolled to one side, that the under mattress may be used for her to lie upon. Over this a folded sheet, blanket, or any soft material, to protect the mattress or cot from the discharges, must be placed, covering that part of it which will be occupied by the patient's hips. During the second stage of labor, some recommend a piece of oil-cloth, or leather, or india-rubber cloth—these are all proper, but are not always at hand. Upon the folded blanket, or material that is employed, the sheet upon which the patient is to lie, may be placed. Care must be taken that in preparing or *guarding* the bed, as it is sometimes called, no depressions or concavities are formed, into which the pelvis might sink down; at this point it should rather be elevated a little. Thus arranged, the bed is ready for the delivery when it comes on.

A piece of narrow tape, or bobbin, or linen thread doubled, two or three times, and a few inches in length, must be secured for a ligature. I generally use two ligatures, and which, together with a pair of sharp scissors, should be placed in a convenient position for the practitioner to reach, when it becomes necessary to ligature the umbilical cord and divide it; or these may be handed to him by one of the

female assistants. Long and strong pins should also be held in readiness, with which to pin the binder or bandage, after the delivery; but it will often be found that the female has a binder already made which requires to be fastened and retained with a cord, like a corset but these are generally troublesome and in the way, and I do not like them as well as a good stout towel, or piece of unbleached muslin, about a foot wide, and three or four feet long.

The room must be kept comfortably cool, and free from unpleasant odors, the clothing of the patient should be light and loose, and the diet, if any is required, composed of crackers, gruel, toast-water, tea, and cold water; no stimulating articles of food or drink, nor meats should be allowed, nor should any solicitations be used to induce an appetite.

Everything having been thus attended to and prepared, nothing else can be done than to wait patiently for the second stage of labor; the practitioner can do nothing to facilitate the progress of the first stage, and any interference to dilate the os uteri, or passages through which the child has to be expelled, or in any other way to hasten the labor, is a mark of ignorance, and is fraught with serious consequences. Even the too frequent repetition of the vaginal examination is improper; probably, another examination may not be required for an hour or two, but this will depend very much upon the increased strength and frequency of the pains, as well as the capaciousness of the pelvis, and the yielding character of the soft parts. It is proper to examine the hypogastrium occasionally to be certain that the bladder does not become distended with urine, and this may be done at the time of the vaginal examinations; during a protracted labor, an attention to this circumstance is very important, that the catheter may be used without delay, as soon as a necessity for it arises.

In reference to the condition of the bladder, the accoucheur should always personally satisfy himself, for it often happens that he will be told the urine passes freely, when, in fact, there is only a mere dribbling of fluid upon the recurrence of each uterine contraction, and which may be the liquor amnii, or a portion of urine forced out of the bladder in consequence of its contraction by the abdominal muscles; this latter circumstance is an indication that the bladder contains a large amount of fluid, which requires an artificial evacuation. In introducing the catheter, the index finger of the left hand is to be passed between the labia majora, and carried toward the vestibulum, at the lower part of which, just within the lower angle of the pubic symphysis, the meatus urinarius may be detected by a slight pressure of the finger upon this part; the point of the catheter should then be

passed along the inner surface of the finger, until it reaches the urethral orifice, when a slight movement will cause it to enter. It should be passed upward without force, until about three-fourths of it has entered, being careful not to allow it to slip entirely into the bladder; some small vessel must be in readiness to receive the urine as it passes. When the pelvis is occupied by the head, a flat catheter will be preferable to a round one, as it does not take up so much space in the antero-posterior diameter. Sometimes the introduction of the instrument into the bladder will be facilitated by gently raising the head of the child, during the absence of uterine contraction.

Some time may elapse before the commencement of the second stage of labor, and a few suggestions relative to the mode of employing the time, may be of service, especially to the young accoucheur. If the labor has just commenced, and everything is found right on examination, there will be no necessity for tarrying at the house; the practitioner may return home, or visit other patients, being careful not to allow his absence to exceed one hour, as it may then become necessary to institute another vaginal exploration. Much, however, will depend upon circumstances; if it be a first labor, it will not, probably, progress very rapidly; if previous labors have been rapid, too long an absence from the patient is not advisable, and more especially when the os uteri is dilated to nearly the size of half a dollar, or is very soft and dilatable; for it must be remembered, that although it may have required several hours to obtain the above degree of dilatation, the remainder of the process may be effected in a very short time, and labor be completed by only a few more pains. Should the physician conclude to remain with the patient during the first stage of labor, and which is the course usually pursued when the visit is late at night, it is not proper that he should continue all the time in the parturient chamber, as it may prevent his patient from attending to the fecal and urinary discharges, the calls to one or both of which are apt to be rather frequent. He should retire to some other room, generally, if possible, so situated that he can hear the cries of the female, and thus be able to determine the progress of the labor, as well as the necessity for another examination. Or, if this can not be done, the room not being favorably situated for the purpose, he will request the nurse to inform him, from time to time, of the advance of the pains, their frequency and strength. While thus absented in another room, he may employ himself in reading, in conversation, etc., but should never permit himself to become so far interested in whatever employment he adopts, as, for a moment, to forget his patient. Or, if there is a probability that the labor may

not require his immediate attention for a few hours, he may lie down on a sofa or bed, and enjoy a short sleep, until the nurse awakens him, at such time as he may have requested. If there is but one room occupied by the family, as is frequently the case with the poorer classes, it will be proper for him to leave it occasionally to take a peep at the stars, or a glance at the weather, or to inhale a little fresh air, for the purpose of relieving a little dullness of feeling, etc., remarking as he goes out, that he will return in ten or twelve minutes; thus giving the female an opportunity to attend to her evacuations. These little attentions, and especially if performed with a degree of delicacy, will always produce a favorable impression, which may subsequently prove advantageous to the physician.

While in the room with the patient, it is always proper to speak encouragingly to her, and endeavor to cheer her up, occasionally assuring her when such is really the case, that everything is going right. But, above all things, avoid that very reprehensible and demoralizing practice, which is too common among some persons, of indulging in filthy and obscene conversation; some individuals, and among them I regret to say are found females, seem to select this as the best time for the delivery of all the obscenity with which their minds are filled, and vie with each other as to who shall bear off the palm in such disgusting loquaciousness. This kind of chat has a depressing and injurious influence upon the patient, beside polluting the minds of all present; and I have no doubt, but that the first approach toward a departure from virtue, has, with many females, commenced in the parturient room, where these coarse and indelicate conversations were permitted. No gentleman, and certainly no lady, would be guilty of such low and undignified behavior. It is the duty of the physician, at all times, and under all circumstances, not only to preserve and protect the health of his patient, but likewise to preserve and protect the purity of her mind; and any one who pursues a different course, should not be recognized as a professional brother nor as a man worthy the confidence of community.

It is not necessary, during the first stage of labor, that the female should retain the recumbent position, she may sit up, walk about, lie down, and change her position, according to her inclination; nor should any bearing-down efforts be permitted during this stage, as they exhaust the patient's strength, without effecting the least benefit whatever, and may also cause a premature rupture of the membranes, and thus convert the labor into a difficult one. It is only when the

os uteri is fully dilated, and the membranes have ruptured, that she must assume the recumbent position, or make use of any voluntary efforts at bearing down.

After the full dilatation of the os uteri, until the birth of the child, the female should be required to remain in the recumbent position, lest, while moving about, the child should suddenly be expelled upon the floor, and the uterus, following the cord and placenta, become inverted. But, in a prolonged labor, where there is no immediate danger of rapid expulsion, she may be permitted to sit up at short intervals, as well as to change her position on the bed. If, at the complete dilatation of the os uteri, the membranes have not ruptured, *the head presenting*, and the soft parts being yielding, the accoucheur should rupture them; but not under other circumstances, except those referred to hereafter. Sometimes, the head emerges from the vulva simultaneously with the rupture of the membranes, but this most commonly occurs in cases where the membranes are unusually tough, and have been allowed to remain entire until the head has cleared the os uteri and advanced considerably into the pelvic cavity.

During the *second stage of labor*, many practitioners pass a towel around each fore-arm, without removing the coat, as a protection against the discharges. The towel is doubled so as to form a triangle, the base, or folded edge of which, is passed rather tightly around the wrist, but not so as to interfere with its free motion, the rest being folded with one end over the other, around the arm, and then pinned, and which is usually done by some female present. Others, again, have oil-silk sleeves for the purpose which they draw on over the coat sleeves. Some, merely remove the coat, and roll up the shirt sleeves, thus having a free, unimpeded use of the hand and arms, especially in cases where manual assistance is required. This latter plan is the one which I prefer; but the accoucheur may please himself in these respects.

After the rupture of the membranes, the practitioner should make no delay in ascertaining the *position* of the presentation; and an early examination, at this time, is often of much importance, as any mal-position may be more readily rectified than at a later period. The situation of the head at the time of the rupture varies; most commonly it will be found just within the brim, sometimes midway in the pelvic cavity, or at the perineum, etc. The position of the head may be determined by the rules heretofore named. During this stage of labor, the patient should not be left by her medical attendant, who will find it necessary to repeat his examinations every four, six,

or eight pains, according to their frequency and strength, and the rapidity with which the head advances; and after these examinations, it is not necessary to wash the hands each time, but merely to dry them on a napkin, secured for the purpose. It is also an excellent plan for the accoucheur, by means of a flexible stethoscope, to examine the condition of the fetal heart from time to time, both during natural and unnatural labors, as the information thus acquired may prove of great value in the management of the case, and save his patient much suffering and danger. Should the patient suffer from cramps of the lower extremities, they may be removed by frictions with the hand over the part affected, or ligatures around it, or warm applications; pain in the sacrum, occasioned by pressure of the presenting part upon the anterior sacral nerves, may be relieved by firm, counter-pressure against the posterior face of the sacrum, during a pain, and which should be made by the nurse, or some female present; the practitioner should avoid any fatiguing exercise, or manipulation, unless when imperatively required. If, however, the pain should be very severe, and no relief be afforded by the counter-pressure, and the efficiency of the pains be, at the same time, diminished, it may become necessary to relieve the agony of the patient, by hastening the delivery with the forceps. I have heard of a Professor of Obstetrics, who informed his class, that he had relieved several instances of this kind, by placing a folded handkerchief between the head and the nerves. But it must be remembered, that this would still further diminish the diameter of the pelvic cavity, and be very apt to produce irritation, dryness, and probable inflammation of the parts; perhaps the Professor may have dreamed of these several cases, and forgotten that they were but dreams.

The position which I prefer for the *delivery*, is on the back, having the knees flexed toward the abdomen, and the feet resting against some support, as the footboard of the bed; and a sheet or towel fastened to the bedpost, may be held by the patient, upon which she may pull during the presence of the pain, or the hand of an attendant may be used. In this stage, the auxiliary aid of the diaphragm and abdominal muscles are useful, and the patient may be advised to make bearing-down efforts, when the pain is on. Her dress should be so far drawn up underneath her, as to prevent it from being soiled by the discharges. And until the period when the head presses upon the perineum, it is not necessary for her to remain in one position all the time, though she must not be allowed to get out of the bed. It is during this stage, that many practitioners have applied an obstetrical supporter. As a

general thing, supporters have not been found so useful in practice as was at first supposed, and are seldom, if ever, made use of by the obstetrician.

Various other positions for delivery, are recommended by writers, and assumed by females; as sitting, kneeling, leaning over a chair, and lying on the left side. Females, generally, will assume the position recommended by the physician, but where they obstinately prefer a certain position, and it is immaterial, so far so the delivery is concerned, it is better to allow them their own way. Lying upon the left side, with the knees flexed, and a pillow placed between them, is the position most generally recommended in this country and England; but I do not think that the delivery proceeds with so much ease and rapidity, nor it so convenient for the practitioner in every respect, as when the female is placed upon the back. Some writers maintain, that the action of the uterus is frequently interfered with, and the progress of labor impeded, when the female lies on her left side, in consequence of an obliquity of the uterus, caused by this position; also, that the too close condition of the limbs, produced thereby, retards the labor, and to overcome which the advocates of this position, advise a pillow to be placed between them, which causes much unnecessary heat. When lying upon the back, the limbs can be kept apart with ease, the axis of the uterus is brought into a favorable direction for an easy delivery, and the patient, being in a position requiring no muscular exertion to maintain, can freely and more powerfully employ the abdominal muscles.

When the head has reached the perineum, the practitioner will take his seat, by the bedside, in the position heretofore named, and as the part begins to distend, he should keep his finger gently upon the head, during each pain, so as to ascertain the proper period for supporting the perineum, in order to protect it from becoming lacerated, and the advance of the head must be determined, not by its condition at the pubic arch, but at the perineum. As soon as *the perineum is fully distended and protruding, and the head about emerging*, and not before, a folded cloth, or napkin, light and not too thick or bulky, may be placed over it, extending from its anterior edge to the coccyx, and which must be sustained by either hand, as the case may require, more commonly the right. The pressure, made in giving support to the perineum, must be moderate, it must not interfere with the advance of the head, the part requiring firmer support toward the coccyx than at its anterior edge; and instead of making efforts to retract the skin over the head, as it passes through the orifice, the perineum and the head

should be carried upward and forward in the direction of the axis of the inferior strait; this action would press the fetal head toward the pubic arch, and tend to elongate the perineum forwardly, thereby diminishing the risk of laceration, by facilitating the movement of extension of the fetal head. This pressure should not be long continued, nor should it be made at all, except when the pain is present, and it would be much better to leave the part entirely untouched, than to make improper pressure, which has frequently, of itself, occasioned the very difficulty it was intended to obviate. There is scarcely any necessity for this support when the perineum is gradually yielding to the normal advance of the fetal head; but when the head is rapidly advancing, the perineal tissues not being sufficiently softened, support of this kind may prevent laceration; and it may also be useful in cases of delivery by the forceps. Some authors advise to support by pressing the bare thumb upon the anterior edge of the perineum, while the index and second finger rest upon the vertex to check its too rapid advance; this, to my mind, is equal to no support at all, the object of support being, in my opinion, to elongate, as it were, and aid in the relaxation of the perineum, and at the same time to press the occiput against the pubic arch and facilitate the movement of extension.

My experience in this matter, leads me to believe, that laceration of the perineum would be a rare accident, were the rule to support it during the latter part of the second stage of a normal labor, entirely dispensed with in obstetrical practice. Some writers recommend the support of the perineum, not only during the passage of the head, but likewise of that of the shoulders, from a belief that the perineum is frequently lacerated as the bis-acromial diameter is emerging; in some instances, an attention to this point may prove serviceable, but I do not regard it necessary as a general rule.

While the head is at the perineum, pressing upon the lower part of the rectum, a great disposition to evacuate the bowels will be produced, and the female will desire to rise and attend to the call; but it must by no means be granted, as a violent pain might come on, and the child be delivered, and perhaps, destroyed, before the physician could bestow the necessary attention. Beside, these desires generally disappear with the delivery of the head, the pressure of which upon the parts has occasioned the tenesmus. I have twice witnessed the delivery of the child, and its reception into the chamber-utensil, where the physicians had permitted the females to attempt an evacuation of the rectum, at this stage of the labor. Again: should the bowels not have been opened, early in the labor, and the probability is, that a fecal discharge

may happen, the patient must not be permitted to rise from the bed, but must perform the evacuation on some old, useless cloths, to be placed under her for such purpose, and which are then to be immediately removed.

It is sometimes the case, that the pains cease, or diminish in strength, toward the close of the second stage, but they may be renewed by making firm pressure with the left hand, upon the uterus, each time of its contracting, or, by pressing firmly on the end of the sacrum.

As the head passes through the vaginal orifice, the leg on the side toward the practitioner should be raised and flexed at the knee, to facilitate its passage, and to enable the attendant to act with greater accuracy and promptness; the fetal head should be received into the right hand, holding it loosely, so as to admit of the motion of *restitution*, and, at the same time, a finger should be passed around the neck of the child to ascertain whether the umbilical cord is coiled around it, and which commonly occurs when the cord is of more than ordinary length.

If the neck be embraced by one or more turns of the cord, it must be liberated by loosening it, and passing it over the head; or else the following results may ensue, especially if the cord be short: the compression may arrest the circulation in the blood-vessels of the neck, and prevent the access of air into the lungs by closure of the trachea, thus destroying the child; or, the expulsion of the child by a strong pain, might cause inversion of the womb, or serious hemorrhage by tearing the placenta from its uterine attachment. If the cord can not be easily passed over the head, it must be loosened as much as possible, so as to prevent strangulation of the vessels of the neck; for it must be remembered, that ordinarily, even with two or three coils around the neck, the cord will be sufficiently long for delivery to take place, without any evil consequences to the mother. Sometimes, the cord is so placed around the neck, that it has to be divided before the body can be born, a ligature being applied as soon as possible; but this is done only in those extremely rare cases, where the free portion of the cord is rendered so short as to endanger inversion, should the child be delivered. It is frequently the case, that an evacuation of the rectum occurs with the expulsion of the head, but the compress at the perineum serves to protect the hand of the accoucheur from being soiled by it. The use of a napkin or compress in supporting the perineum has been termed *most absurd*, the objection being that it absorbs the great secretion of mucus designed to lubricate the parts and thereby render the passage of the head more easy. I have never found any

difficulty from this cause, which may be readily obviated by applying oil or lard upon the perineum, and, if necessary, also upon the compress. The principal object of the compress has just been referred to—the support can be given as well without as with it.

As soon as the head is born, the child commonly commences crying lustily; frequently, however, the presence of mucus interferes with its breathing, and the practitioner should pass a finger into its mouth for the purpose of removing any mucus or other obstruction that may exist there. More commonly, simply wiping its mouth with a small napkin, will answer the purpose, by removing any mucus that may have accumulated around the lips.

No attempt, whatever, should be made at removing the body, unless much delay occurs in the natural process, or, the life of the child is in danger. After the birth of the head a short interval generally follows, but if this is prolonged, serious consequences may result; under such circumstances, a finger may be inserted into the axilla nearest the perineum, and traction made in the direction of the axis of the inferior strait, while, at the same time, pressure is to be made by the other hand, or by an assistant, on the abdomen over the uterus. One shoulder disengaged, the other follows, and the child is born without any further trouble. I prefer, however, as the rule, to arouse the uterus to act and expel the child, by making firm pressure, through the abdominal walls, upon the uterine fundus, and which will also be found to facilitate the delivery of the placenta. But, when the body follows the head without requiring any assistance to expel it, the right hand must be passed along with the head, supporting it as it moves, and the body must be supported by the left hand; and as soon as the child is expelled, it should be laid upon its right side with its back to the mother's genitals, to prevent it from receiving any of the copious discharge which follows, into its mouth; or it may be placed with its abdomen toward the mother, so that the mouth is protected from the discharges. And in moving the child, care must be taken not to make sudden or powerful traction on the cord, as the uterus may become thereby inverted, or a portion of the placenta by being roughly detached, may occasion alarming hemorrhage.

The expulsion of the child terminates the second stage of labor; and it must be ever borne in mind by the physician, that in a case of natural delivery, there is nothing for him to do in these two stages, except to witness the progress of the labor, to console and encourage his patient, and to receive the child after its expulsion. Any interference, in either the first or second stages, when everything is

proceeding favorably, further than I have just described, is exceedingly improper and criminal.

I am aware that some writers advise, and many practitioners adopt the plan of administering Ergot to all parturient women, in the second stage of labor, for the purpose as they say, of promoting the easy expulsion of the placenta, and a subsequent uterine contraction, thereby lessening the risk of hemorrhage; but, more for the purpose, as I strongly fear, that they may the sooner visit another patient and procure another fee, or, perhaps, from want of sympathy and patience. I consider this a very unscientific and censurable practice, and have witnessed many accidents resulting from it; indeed, when the influence of the Ergot has subsided, the reaction that must ensue, would be very apt to produce a condition of the uterine tissue favorable to hemorrhage from that organ. From a practice and observation of thirty years, I am thoroughly convinced, that the administration of Ergot to cause contractions of the uterus, *whether indicated or not*, occasions and develops a greater proportion of diseases of the organ, than is generally suspected by the profession. I have found Sulphate of Quinia, to answer a much better purpose, when it is desired to keep up permanent uterine contraction after delivery, though, as with Ergot, it sometimes fails. It may be given alone, or in combination with powdered Cinnamon.

A natural labor may be accomplished in two hours, or it may continue for twenty-four or even longer, without any danger. The danger is never to be estimated by the time which the process occupies, nor by the severity of the pains, but by the symptoms which are present. So long as the parts are in a proper condition, position and presentation right, and the pulse unaffected, there is no necessity for haste, alarm, or officious intermeddling, no matter how long the labor continues; the practitioner should appear cheerful, resolute, and confident, at once check any complaints or whisperings among the female attendants, and use all means to sustain the patient's spirits, and preserve her from a despondency, which may cause a suspension of uterine contraction, and convert the labor into a difficult one. But, if the parts become hot and dry, with more or less tenderness on being touched, and the pulse accelerated, it is then necessary to interfere, calmly, deliberately, without violence or rudeness, and employ the proper means to overcome the difficulty.

Sometimes, after the delivery of the child, the female will be attacked with violent pains, and forcible straining, or bearing-down efforts; as these may be owing to a disposition to inversion of the

uterus, the practitioner should endeavor to ascertain their cause, and remove it if possible, at the same time urging upon the female the importance of resisting these efforts as much as possible, lest inversion should be produced by them.

The *third stage of labor* commences after the birth of the child [the placenta not having been expelled simultaneously with the child], and may be considered the most important period of the process, for by far the greater part of the accidents of labor occur at this time, either from improper intermeddling, or from an ignorance of the correct mode of proceeding. After having observed that the child is living, as made known by its crying, it must be separated from its uterine attachment; and this must be effected without any exposure of the mother—a point which I desire the reader especially to impress upon his mind—as many practitioners, at this stage, are very apt to needlessly expose their patients.

As soon as the pulsation of the cord of the living child ceases toward its placental extremity, say at a distance of five or six inches beyond its abdomen, or, as far as can be reached by the hand without introducing it into vagina, the accoucheur will proceed to cut the cord. The child must be withdrawn from beneath the bedclothes, if the length of the cord will permit; or if too short, the operation must be performed under the bedclothes, raising them to effect it, taking especial care, however, to previously place over the parts of the patient a well-aired cloth or towel, that they be perfectly covered and concealed.

The ligatures, which had been prepared in the early part of the labor, are now to be used; they should not be so thin as to risk cutting through the membranes and vessels of the cord, nor so thick as to be incapable of making firm compression, sufficient to prevent bleeding after the separation. The cord is to be tied tightly with one of these, at a distance of an inch or two from the umbilicus, care being had not to include any portion of protruding intestine, which is occasionally met with; as in these cases, the incautious ligaturing of the intestinal protrusion would give rise to the most disastrous consequences. This first ligature is of importance, for if it be not tied securely, so as to compress the vessels, the child may lose its life from hemorrhage; hence, when the cord is large or fat it may require considerable force to ligate it properly; and shortly after dividing it, it will be well to examine and ascertain whether any hemorrhage is occurring from its free extremity. The second ligature is to be applied two or three inches beyond the first, and the division must be made between the

two with the scissors, being careful not to excise, at the same time, a finger, or a portion of the child's penis, if it be a male. In this operation the practitioner should see what he is doing.

I am well aware that many authors advise the application of but one ligature, and consider the employment of the second superfluous, but I prefer two in all cases, not from an erroneous impression held by some, that the female may lose blood through the unprotected, open vessels of the cord, but for the following reasons: In the first place, I am well convinced, that, in many instances, by thus retaining the blood within the cord and placenta, it acts as a provocative to uterine contraction and insures a speedy detachment and expulsion of the placenta; secondly, it is much more cleanly, and dispenses with the pressure of the thumb and finger to prevent the blood from spurting over the bedclothes, or even on the clothing of the practitioner; thirdly, it is safe in case of twins, with anastomosed circulation in the placenta, should the practitioner, as is frequently the case, have neglected to place his hand on the abdomen to ascertain the size of the uterine tumor, and the probability of the presence of a second child; and fourthly, should it be judged advisable not to have the second ligature, it can very readily be removed, or another division of the extremity of the placental portion of the cord be made.

It is sometimes the case that the child is born in a state of defective vitality, asphyxia, or apoplexy. If the pulsation in the cord continues, and the child does not breathe, some cold brandy sprinkled on the region of the diaphragm, or suddenly dashing cold water upon its back and chest, and perhaps a few light frictions made rapidly over the body and extremities with a piece of warm flannel, will be all the means required for its resuscitation; previous to which, however, the finger must be passed carefully into the mouth, as far down as possible, in order to remove any mucus which may be present, obstructing the respiration.

Where these means do not suffice, it may become necessary to produce artificial respiration, which will not, however, be found of so great value in cases of congenital asphyxia (in which air has never entered the fetal lungs) as in other forms; a flexible catheter, or laryngeal tube must be cautiously and correctly introduced into the larynx, after which the angles of the mouth must be closed to prevent the escape of air; the practitioner will then apply his mouth to the free end of the tube and slowly and gently inflate the lungs, simulating breathing by making gradual pressure on the chest to expel the air, which he continues to introduce for some time; with these attempts

he may also sprinkle water or brandy over the face and chest, apply warm flannel to the surface and administer an injection. Some children are not resuscitated until after a persevering trial of an hour or two. Respiration may also be excited by the Sylvester method, which consists in lifting the child by its two arms and then lowering it to a sitting posture, gradually carrying the arms to the corresponding sides of the body; these elevating and depressing movements are to be continued alternately for some time; they tend to produce movements strongly resembling those of natural respiration. Dr. Harvey L. Bird, of Baltimore, advises an easy and speedy method in asphyxia, which consists essentially in placing the palms of the hands, (the *ulnar* edges being in approximation) under the back of the child in the dorsal decubitus, the thumbs being extended toward the head and extremities. Keeping the ulnar edges of the hands together, the radial sides are simultaneously and alternately elevated and depressed so as to raise and lower the child's body about forty-five degrees above and below the horizontal line, the downward movement allowing air to enter the lungs, while the upward facilitates its escape. These alternate movements performed with gentleness and regularity, the child's head being kept in the median line of the body, rarely fail in effecting respiration in a short time, where life is not extinct. The first symptom of returning life is a short sob, which increases in frequency until respiration is established, after which, the child should be kept at a sufficiently elevated temperature, and in a state of rest and quiet. Upon the first return of vitality, the warm bath used for a very short time, frequently facilitates the restoration.

This condition of the child may arise from a premature detachment of the placenta, from uterine hemorrhage, or from defective nourishment, and is generally accompanied with little or no pulsation in the cord, and but slight action of the heart, and as nothing is to be gained by maintaining the connection of the fetus with the uterus, it will be proper to ligate and cut the cord; but in all instances where the pulsation of the cord is distinct, though feeble, I deem it inadvisable to make the division, until respiration has been fully established; and in those cases where the placenta has been expelled, it should be wrapped in warm, damp cloths, and no separation be made until all pulsation in the cord ceases.

Apoplexy may be known by the lividity of the face, blueness of the surface, labored, or obscure action of the heart, and feeble, or imperceptible pulsation in the cord; while, in the instances above referred to, the color of the surface is natural, or pale. Apoplexy may result

from prolonged labor, compression of the head by a narrow pelvis, or from a delay in the expulsion of the body after the delivery of the head, etc., and it must be treated by removing the cerebral and pulmonary engorgement. In these cases it is recommended to cut the cord without ligaturing it, and allow the escape of from half an ounce to an ounce of blood, at the same time sprinkling tepid water over the head, face, and chest. As in the previous instances, the mouth and fauces should be freed from mucus, and artificial respiration may be attempted. If recovery ensues, the surface becomes paler, or slightly rosy, the pulse more frequent and stronger, and efforts at inspiration are made; and when these symptoms appear, the cord may be tied. In all these instances, the practitioner should not become discouraged at too early a period, and therefrom slacken his efforts, as almost hopeless cases have been resuscitated after long, but patient and continued treatment. When the pulsations in the heart and cord have ceased for several minutes, attempts at restoration will be useless.

The cord having been cut, the child is to be passed to the nurse, who is generally ready to receive it in a small blanket, prepared for the purpose; but as its body is very slippery with the waters, blood, or vernix caseosa, there may be danger of dropping it, if it be not taken hold of properly. To avoid any such mortifying accident, the practitioner will seize it by the ankles, with his left hand, placing a finger between the two; and will have the back of its neck to rest in the arch formed by the thumb and index finger of his right hand, resting the upper portion of its back upon the palm of his hand, and placing the points of the three remaining fingers under its right axilla; thus held, it can not fall. Some advise the left hand to be placed at the breech, with one finger between the legs, the left thigh grasped by the thumb, and the right thigh and nates resting on the remaining fingers and palms at the same time making gentle pressure of the hands toward each other, for the purpose of more firmly securing the child. Either of these methods may be safely adopted.

The next thing is to ascertain, if it has not been previously done, whether there is another child in the uterus; this may be known by placing the hand on the abdomen, when the fundus uteri will be felt still in the epigastric region; and an examination per vaginam will detect the bag of membranes, and the presenting part. If, however, the uterus be found small and hard like a solid ball, when grasped through the abdomen; or small, but soft and doughy; or small, but becoming hard and soft alternately, no second child is present, and the placenta has probably passed, either partly or wholly into the vagina.

If it be hard and nearly the size of the adult head, there is no child, but a contraction of the uterus, upon the mass inclosed within its cavity; and if it be thus large, but soft and doughy, contraction of the organ has not yet taken place for the purpose of expelling the placenta. The treatment of twin cases will be considered hereafter. Having ascertained that no twin-child is present, the practitioner will attend to the *delivery of the placenta*; occasionally, the same pain which expelled the child likewise ejects the placenta. But, usually, from five to thirty minutes elapse from the birth of the infant, before the uterine contractions are renewed for the purpose of removing the secundines. The left hand should be placed on the hypogastrium, and if the uterus be found hard and well defined, and the patient complains of some pain, but not so severe as before, the organ is contracting and expelling its contents, and the right hand should be ready to receive them as they emerge. If, however, the uterus be found large, soft, and yielding, or, if it be not felt at all, it may be caused to contract by gentle friction and pressure on it, through the abdominal parietes, and as soon as it contracts, the woman should bear down, and slight traction be made upon the cord with the right hand in the direction of the axis of the superior strait, which will carry the cord backward to the os coccyx, and as soon as the placenta moves the motion will be recognized by the hand,—frequently a crackling sensation, or as if tearing a piece of thin silk. In the meantime, the left hand should continue upon the hypogastrium, both for the purpose of exciting the contractions, as well as to admonish a cessation of the traction, whenever the uterus grows soft, or manifests a tendency at some portions of the fundus, to become depressed and follow the direction of the traction, and thus, probably, be partially or completely inverted. Whether the placenta be in the uterus or vagina, if the soft condition of the uterus continues, notwithstanding the means used, the labor may be complicated with hemorrhage, to treat which, according to the rules hereafter given, the physician must be thoroughly prepared. Crede's method of aiding or forcing the delivery of the placenta is stated to be superior to any other, as it does not endanger the tearing away of the cord, produces a tonic contraction of the uterus that diminishes the tendency to subsequent hemorrhage or to severe after-pains, and aids in the prevention of puerperal disease. It simply consists in grasping the uterine fundus, through the abdominal parietes, with the hands, in such a manner that the organ can be forcibly compressed from above downward and backward; and which, as the rule, causes the detachment and ejection of the placenta. The operation is the more readily

effected the sooner it is employed after the delivery of the child. Of course this method is inapplicable when hemorrhage is present.

When the placenta has emerged from the vulva, it should be twisted or turned around several times, for the purpose of forming a cord or string of the membranes, that, thereby, no portion of them be left attached to the uterine surface, thus effecting a clean and perfect delivery, and the accoucheur should always examine its uterine surface to ascertain whether *any portion* of it has remained within the uterine cavity. If a portion of the membranes be left within the uterine cavity, it may give rise to unpleasant symptoms, as hemorrhage, putrefaction, offensive discharges, etc.; or should portions of them pass away in a few hours afterward, they may occasion alarm to the patient, or lead her to think that her medical attendant is not perfect in this department of his profession.

It is always proper for the practitioner to ascertain as early as possible after the birth of the child, whether the placenta is detached, that he may remove it, and this may usually be known by the absence of pulsation in the cord, which becomes cold and flabby, and, generally, renewed but less severe pains with a slight discharge of blood; but, unless there be flooding, or some other circumstance demanding the immediate delivery of it, it is inadvisable for him to make any more active efforts than above named, to bring about its expulsion when not effected naturally, for at least one hour subsequent to the child's egress; then he will treat it as a retained placenta. And in all cases of natural labor, it must be thoroughly impressed upon the mind, that no force or haste is required in the removal of the placenta and membranes, but they should be drawn forth slowly and carefully, to prevent any tearing of the membranes, or cord, or other unpleasant accidents arising from too hasty a removal of them from the uterine or vaginal cavity.

The secundines being completely removed, the practitioner will request the nurse to bring a basin or some other vessel, in which to place them, covering them with a cloth, "for the sake of decency." Then he will ascertain, by placing a hand on the abdomen, whether the uterus is small and contracted, or large and soft, which latter condition indicates a tendency to internal hemorrhage, and the pulse and countenance of the patient should be at once examined, as described hereafter. The delivery of the placenta closes the third stage of labor; a stage of the process which requires much judgment and presence of mind, for the slightest mistake or misconduct might lead to the most serious consequences; and with all difficulties which may

occur at this stage, as well as their treatment, the physician should be thoroughly and familiarly conversant.

As soon as possible after the birth of the placenta, and especially in cases where it has been found necessary to extract it artificially, the practitioner should ascertain that there is no inversion of the uterus, and, if it has not been previously accomplished, should likewise examine the placenta and membranes to see that the whole of them have passed away, and that no portion of them has been left within the uterine cavity, subjecting the patient to severe pains, nausea, vomiting, and hemorrhage. In this examination both surfaces of the placenta should be inspected.

Unless there are certain circumstances, or symptoms present, which will be referred to hereafter, it is not material that the bandage or binder should be applied until after the expulsion of the placenta. It should be passed under the patient's back, carefully, being made to embrace the hips and the whole abdomen, and without requiring any efforts on her part to assist in its application; it should be pinned or fastened from below upward, having that portion around the hips and lower part of the abdomen, more tightly applied than the rest, or sufficiently tight to occasion a very slight degree of uneasiness when first placed on. If, however, there should be considerable of the discharges present, so as to endanger wetting the binder, these must first be removed, or covered over with dry cloths. When hemorrhage is present, the bandage is in the way, and should not be applied until this is overcome. Many writers consider the bandage of no practical importance, but I am well convinced of its utility during the first forty-eight hours after labor when it is carefully and properly applied. When firmly applied, and pressing equally upon the anterior surface of the abdomen, it promotes the regular contraction of the uterus, and gives support to the viscera and to the suddenly relaxed abdominal walls, thereby diminishing the risk of concealed hemorrhage, and syncope, and also tends to prevent air from passing into the uterine cavity; it likewise assists a return to the natural condition of the abdominal parietes, preventing that lax state of the integuments which causes a "pendulous belly," but if used simply for this purpose, it can well be dispensed with. When, in dropsy of the abdomen, the sudden removal of the pressure is effected by tapping, unless a bandage is applied and tightened as the water passes off, syncope and nausea are very apt to ensue; and fatal syncope has occurred shortly after parturition, from no other attributable cause than the omission of the

bandage; the removal of the uterine contents in labor, whereby a removal of pressure is speedily accomplished, is a somewhat analogous case, requiring similar measures for relief. The binder may, if necessary, be worn for a few days succeeding delivery, not certainly to exceed three or four; and its longer employment, as advised by some physicians, for two or three weeks, strikes me as being a useless measure. A bandage applied too tightly, and especially when worn longer than the first few days, would, in my estimation, very much endanger some displacement of the uterus, paralyze or greatly weaken the abdominal muscles, force the uterus into the pelvic cavity by pressing the intestines upon it, check to a greater or lesser extent a free circulation in the organ by compression of the vena cava and pelvic veins, and greatly interfere with the accomplishment of involution. It should be applied so that the uterus will be pressed downward rather than backward; and, in some cases, it may be advisable to place a sufficiently thick compress under it, in order to secure the proper compression to aid in preventing uterine relaxation with flooding. It will be observed from the above, that since the publication of the last edition of this work, further and more attentive experience has considerably modified the views therein expressed relative to the binder. Generally, the binder is applied by the nurse or some female friend, but the physician should understand how to apply it himself, and should always ascertain that it is properly placed and tightened before leaving the patient. He will, frequently, be requested to place the bandage on his patient, but, as a general rule, I consider it a task entirely out of his province, and one which should be invariably performed by a female. To be of the greatest service, the bandage should be applied next the skin, and I can not conceive of any office more offensive to female purity and modesty, and more repugnant to the sensitiveness of a man of honor and refinement, than that of bandaging a naked and exposed parturient woman. True, physicians and females have often to be placed in even more delicate and exposed situations than this, but then it is only in those cases in which health and life render it imperatively necessary, and in which, from the dangers to the patient, modesty becomes a vice. She must be, truly, an ignorant nurse, who is incapable of correctly bandaging a parturient female. Although I consider the application of the bandage, the duty of the nurse, yet it is the physician's duty to ascertain, after it has been done and the female covered, whether it is applied properly. And in those instances where he is desired to place the bandage, himself, and no excuses will be received, he may adjust it over the body-garment

of the patient, and thus obviate the necessity for exposure. After the application of the binder, some warm, dry cloths should be loosely applied to the vulva, for the purpose of absorbing the discharges, and preventing them from soiling the dry clothes of the patient. These cloths should be examined from time to time, while in the house, for the purpose of aiding in the determination of the degree of hemorrhage; and for the same purpose, the hand may be placed upon the abdomen occasionally, to learn if the uterus continues contracted; the pulse likewise ought to be felt several times, and inquiries be made as to whether the patient experiences any sensations of faintness.

The "putting to bed," as it is termed, in which the patient is moved into her regular bed, should take place as soon as circumstances will permit; in ordinary labors it may be accomplished in an hour after the delivery, or, following the washing and dressing of the child; but if the labor has been tedious, or very painful, it must be delayed according to the strength and circumstances of the patient. In the process of "putting to bed" the practitioner must be very careful that the patient uses no exertions on her part for the purpose of giving assistance, and that she be not removed from the horizontal position, lest hemorrhage be thereby induced. The husband and two females may carefully raise and remove her, or she may be carried in a strong sheet, held by four persons; it matters not how the removal, or "putting to bed," is executed, so it is with care, and an attention to the above points. But, under any circumstances, the patient should not be allowed to lie for any length of time with the discharges and damp cloths around her, these must be removed as promptly as the condition of the patient will admit, and in a manner not calculated to unnecessarily expose her to any dangers.

As soon as the mother can be safely left for a short time, and the nurse's attention to her can be dispensed with, the child, which had been warmly wrapped up and placed in some safe location, must be attended to. It must be washed and dressed. This is almost always the task of the nurse, or some female present; yet the practitioner should understand how it is to be done, in case inquiry be made of him, or he should be left in a condition where he would be required to act the part of nurse; a part, however, to which I most decidedly object, except in imperative cases.

The body and limbs should be lubricated with Sweet Oil, fresh Lard, or fresh Butter, which will assist in the more ready removal of the sebaceous matter with which the skin of the child is covered at birth; after which, warm Soap-suds will be the only application

required. If the above substance is not thoroughly cleansed from the skin, it may occasion painful and troublesome cutaneous excoriations. Be careful that, in washing and drying, the tenderness and integrity of the infant's skin be regarded, as too much pressure, or too much friction may bruise or abrade it; soft cotton, or linen should be used, both in the washing and drying. Some apply cold water to the infant, but this is wrong, and frequently injurious, requiring a very robust child to pass through the ordeal with safety. The child has just emerged from a situation of an elevated temperature, and a reduction of this temperature too suddenly, or too soon after birth, would, especially in those who are weak and delicate, be very apt to occasion serious and even fatal consequences. In washing the child's head, many nurses are accustomed to apply a small portion of warm spirits of some kind, for the purpose, as they say, of preventing its taking cold; whether this accomplishes the intention or not, there can be no objection to the practice, if too great a quantity of liquor be not employed.

After the washing, the accoucheur will be called upon to *dress the cord*; but previous to this, it will be proper for him to examine the child, and ascertain that it is not malformed or blemished with *nævi*, and that its limbs, hands, feet, mouth, genital organs, etc., are perfect. Some examine for this purpose, even before its washing. This having been done, a piece of soft linen must be doubled, so as to form a square whose sides measure six or seven inches; this is again doubled and folded in a triangular form, somewhat in the manner of preparing a paper filter, so that its point, which will be the center of the square when opened, may be applied to the flame of a lamp or candle, to form an opening of sufficient size, through which to pass the cord. I prefer making the orifice by burning instead of cutting, as its edges are thereby much softer and less liable to increase any existing irritation of the parts in contact with it. This is then opened, and through the orifice thus formed in the piece of linen, doubled, the cord is to be passed. The linen may now be allowed to lie upon the abdomen, and another piece placed over it and the cord, or the cord may be wrapped up in the first piece. But whichever plan is adopted, the cord must be placed upward along the abdomen, rather to the left, in order to avoid any compression of the liver, and then be secured in this position by a bellyband or bandage, passed, but not too tightly, around the child's body. If any blood be found to ooze from the end of the cord previous to dressing it, another ligature must be applied nearer the umbilicus. The remaining piece of the *funis umbilicalis* dries up, and usually falls off in five or six days, though this may vary from

two to sixteen days. It is not, commonly, necessary for the practitioner to examine the cord at subsequent visits, for every time the nurse bathes the child, she makes it a matter of duty to inspect its condition herself, and from her any information relative to it, under ordinary circumstances, can be obtained. As the cord shrivels and diminishes in thickness, it soon has the appearance of a fine spider-web, and which may lead the accoucheur to hasten its separation by cutting it with a knife or scissors, but he must be careful not to attempt this; I have known such an operation to be followed by severe ulceration, and also by hemorrhage. After the application of the bandage, the child should be lightly and loosely dressed, according to the season, and all cumbersome and tight clothes placed aside, as injurious to its health and welfare.

The child should be placed to the breast as soon as possible, for, in many instances, it will at once obtain a supply of the mother's milk; or if there be no milk present, the attempt at sucking is very apt to be followed by its early secretion; but should it fail to suck, or should no milk have been secreted, there will be no necessity for feeding it until several hours have elapsed. Some recommend it to be kept from the breast for ten or twelve hours; this may answer in cases where there is much exhaustion, or where the labor has been protracted; but in ordinary instances I prefer placing it to the breast as early as possible; and this, not so much for the purpose of food, as to excite uterine contraction and thereby prevent hemorrhage. I have met with many instances in which, for several hours after the birth of the child, any attempt made by it to suck, was instantly followed by more or less severe after pains. Should it become advisable to feed the child, a little warm milk and water, without sweetening, or some thin gruel, will be the only food required—[if, however, these articles must be sweetened, it will be better to use sugar of milk, and not cane sugar];—but after it obtains the mother's milk, no other food, whatever, should be allowed, unless, for some urgent reason.

The substance collected in the intestines of the fetus during utero-gestation, is called "meconium," and if it be not removed soon after birth, it will occasion gripings, colic, etc. The first breast-milk of the mother, secreted after delivery, is the best agent for the removal of the meconium; it is called *colostrum*, and contains, in addition to the common milk globules, numerous large cells, or granular corpuscles, whose investing membrane is filled with oil, or common milk globules, similar to those which are floating free in the surrounding fluid. This *colostrum* appears to exert a laxative influence on the child, and is

superior to any other agent for the above purpose; if it can not be had within a few hours succeeding delivery, some Sweet Oil, or Castor Oil may be given, to effect the evacuation. I do not believe in dosing an infant with medicine as soon as it is born, for, owing to the customs and habits of society it will become a charge to the physician soon enough, without attempting medication from the moment of birth; therefore, care and prudence should be manifested in making use of laxatives to purge off the meconium. And, above all things, for the sake of decency and of science, forbid that nauseous, abominable, and worse than heathenish practice, which some old nurses have, of forcing down the child's throat, a disgusting mixture of urine and molasses.

During these attentions to the child, the mother must by no means be neglected; her pulse should be examined from time to time, and other investigations pursued to ascertain the condition of the uterus, and whether any disposition to hemorrhage exists. The practitioner should NEVER leave the house for at least one hour after the delivery of the placenta, and he who leaves earlier than this, is criminally guilty of the loss of his patient, should she, shortly after his leaving, die, from uterine hemorrhage. There is no excuse for him. If it is absolutely necessary for him to leave the house, previous to the termination of the hour, let him have another physician called in, to temporarily supply his place. If the labor has been a tedious one, or the patient is much exhausted, or if the womb does not contract properly, the house should not be left for even a longer period than an hour, depending, however, upon the circumstances of the case.

When about to return home, the accoucheur should place his hand upon the patient's abdomen, to learn whether the uterus is small, hard, and contracted; he should examine the condition of the pulse, and likewise request the nurse to show him the cloth which had been placed at the vulva, that he may form some idea of the quantity of blood discharged. He should direct a light, non-stimulating, but nutritious diet, as, of toast and tea, gruel, barley-water, and similar articles, favoring the patient's desires in this respect when they are not decidedly objectionable, and positively prohibit the admission of friends into the parturient room, for a period of at least twenty-four hours; the room must be kept comfortably warm, and properly ventilated without exposure of the patient, and perfectly free from any noise or excitement. Nervous irritation, fretfulness, feverishness, mania, and even death, have followed the use of a diet not sufficient to afford the nourishment and strength required during the puerperal period. He should leave the most positive orders that the female shall not assist

herself in anything, and especially that she continue in the horizontal position, for the first twenty-four hours after labor, for even the momentary semi-erect posture has frequently occasioned alarming hemorrhage; and he should also ascertain that the bandage is properly secured.

CHAPTER XXVI.

ATTENTIONS REQUIRED SUBSEQUENT TO DELIVERY, DURING THE PUERPERAL PERIOD.

IN about twelve hours the patient should be again visited by her medical attendant, and even sooner than this, where the labor has been tedious, or where there is a disposition to hemorrhage. As with the process of natural labor, so with the puerperal state, when uninterrupted by accidents, no interference is required on the part of the practitioner; the patient will gradually attain her normal condition, unaided; yet as many females, who pass through their labors with safety, perish in the subsequent puerperal condition from inflammatory attacks, it is the duty of the attendant to superintend this condition, that he may at once adopt the proper measures to remove any abnormal symptoms that may arise.

The shock to the nervous system from labor, effects a derangement varying from mere restlessness to absolute hysteria; in easy labors, the patient soon recovers from it, requiring only a state of rest and sleep. When severe, it is characterized by symptoms of exhaustion, with an alteration in the appearance of the eye, an anxious countenance, derangement of the brain, the sensibility of which is either diminished or increased, and a disturbance of the circulating and respiratory systems, as manifested by the pulse, which is slow and labored, or rapid and fluttering, or alternating from slow to rapid, and which must not be mistaken for the pulse of peritonitis, and also by the hurried, panting breathing.

The pulse will be found to increase during the second stage of labor, to diminish after this is completed, and to rise again on the secretion of the milk. A pulse ranging from 100 to 110 in the puerperal state, should be watched, though it is not always indicative of danger. A quick pulse may be present when a large clot is in the uterus, it may occur with diarrhea, gastric disturbance, or severe after-pains; and when found immediately after delivery, it frequently indicates hemor-

rhage. A quick, feeble, fluttering pulse occurs in the collapse from the nervous shock. There is a sensation of fatigue experienced in the shoulders and in the muscles of the abdomen, which sometimes persists for three or four days. It is occasioned by the muscular efforts made during the second stage of labor, and which may be discriminated from peritonitis, by the pulse not being increased, by no aggravation of the pain on pressure, and by the absence of febrile symptoms. When these symptoms are not very severe, they will subside upon keeping the patient quiet, and free from excitement, together with a few hours sleep. If severe, small doses of the compound powder of Ipecacuanha and Opium may be administered with advantage. In some instances, the indication for Sp. Tr. Xanthoxylum, Pulsatilla or the Parturient Balm will be present. The support derived from the bandage will, usually, quickly overcome any weakness that may exist in the abdominal walls. Not unfrequently small doses of Sulphate of Quinia, Sp. Tr. of Macrotys, of Aconite, of Gelsemium, or even of Nux Vomica, according to the indications, will prove efficacious. The diet should be nutritious, the patient kept quiet, the visits of friends prohibited, and for a few days nursing may be avoided. When symptoms of collapse or great exhaustion are present, stimulants may be allowed, as a moderate quantity of brandy and water, wine, or Aqua Ammonia, and these may be given in conjunction with the compound powder of Ipecacuanha and Opium. Special attention has recently been called to Erythroxylon Coca, either in tincture, fluid extract, or infusion, which will, in many instances, no doubt, be found decidedly beneficial. In anemic conditions, small doses of the Acid Solution of Iron may be associated with the other remedial measures. The stimulants may be omitted as reaction comes on, for if continued beyond this, they will be likely to produce mischief.

The *vagina*, notwithstanding its great distension, soon recovers its normal size, and the heat and soreness speedily disappear, unless the labor has been protracted during the second stage; or the lochial discharge becomes acrid. The *integuments of the abdomen* do not so readily recover their natural condition; they remain loose and flaccid for a long time; but if the bandage be properly applied, the only evidence of pregnancy which they afford, will be the white streaks on the external surface of the abdomen, *lineæ albicantes*. The contractions of the *uterus* after delivery, not only reduce its size, but prevent uterine hemorrhage, remove all substances from within its cavity, and dimin-

ish the caliber of its vessels and sinuses. The contraction, however is not permanent, but is followed, after a short time, by an interval of relaxation; and these alternate contractions and relaxations continue for eight or ten days, during which time the organ can be felt and examined through the relaxed walls of the abdomen, after which it becomes so reduced in size as to descend in the pelvis, when it can no longer be distinguished through the abdomen. A day or two after delivery, the lining membrane of the internal cavity of the uterus, appears loose, somewhat softened, wrinkled, and covered, more or less, with patches of decidua. At the placental site the part is raised, and the surface is unequal, like a granulating ulcer, and its size is very much reduced. The whole internal surface of the organ is of a dark ash color, with a greenish or brownish discharge upon it, which has been mistaken for a gangrenous condition. The uterine structure is not so dense as in its natural state; its fibers are more distinct, and the sinuses are still evident, being filled with clots of blood at the placental site. The os and cervix uteri appear bruised and ecchymosed, and small lacerations or abrasions may sometimes be observed, which occasionally degenerate into ulcers. The orifice remains open for several days, closing gradually.

The contractions of the uterus, which ensue after delivery, are usually accompanied with more or less pain, termed AFTER-PAINS, and which are more common to multiparous women than primiparous; being more generally absent in the latter. Females who are the subjects of dysmenorrhea are said to be the most liable to these pains, which vary greatly in their severity and duration. They commence soon after delivery, say from half an hour to an hour, and continue from twenty-four to sixty hours. No bearing-down efforts accompany them, nor is the frequency of the pulse increased. These pains are useful not only in reducing the uterus to its non-gravid condition, but, by expelling coagula, pieces of membrane, and the fibrinous clots which plug up the sinuses, they also prevent irritative fever. They are frequently brought on, or increased, upon applying the child to the breast, which is an argument in favor of this being done at an early period after delivery, in order to assist in promoting these contractions and thereby lessening the risk of hemorrhage.

After-pains may be usually distinguished from peritonitis, by their periodical returns, by being unaccompanied with fever or an excited pulse, by the persistence of the secretion of milk, and the discharge of

the lochia, and by not increasing in severity upon pressure, though it must be recollected that the muscles of the abdomen may feel sore when pressed upon. They require no treatment unless severe, when they may be overcome by the administration of Sp. Tr. Macrotys, or compound powder of Ipecacuanha and Opium, either singly or in alteration; the mixture known as Diaphoretic Powder has been administered with benefit. Should the pains resist the use of these agents, and which resistance will usually be found to depend upon retention of coagula, the rectum should be unloaded by a purgative enema, and hot fomentations should be applied to the abdomen, which will cause a prompt discharge of the clots, followed by immediate relief to the patient. The application of Hops, heated in a small sack or equal parts of Hops and Tansy, made into a fomentation with Whisky or some kind of Spirits, and applied over the abdomen warm, renewing it from time to time, together with the internal administration of compound powder of Ipecacuanha and Opium five grains, repeating the dose every three hours, has, in my practice, afforded prompt relief in severe after-pains that had obstinately resisted all previous treatment. Sulphate of Quinine, in doses of two to five grains, one, two, or three times a day, alternating with Sulphate of Morphia, in doses of one-eighth to one-fourth of a grain, will frequently check after-pains which have resisted other means. The process of involution is greatly facilitated in a majority of instances by the use of Macrotys and Pulsatilla; Phytolacca also seems to exert a specific influence in this regard, as well as the Parturient Balm. Other remedies have been recommended in this difficulty, but I have found the above all-sufficient in the numerous cases which have come under my notice. There is a species of pain, of a very excruciating character, which sometimes follows delivery; it does not intermit like the ordinary after-pains, but is continuous, and is located in the coccyx and extremity of the sacrum. It may be relieved by introducing an opiate suppository into the rectum, or by the internal administration of the compound powder of Ipecacuanha and Opium, or other mild anodyne.

Rheumatism of the uterus may render the retraction of this organ after delivery, very imperfect, causing it to continue enlarged above the superior strait. In this case the after-pains are prolonged and very severe; and the want of sufficient contraction upon the bleeding vessels may give rise to profuse hemorrhage. This may be overcome by pursuing a treatment similar to that named in another chapter.

In addition to the above-named conditions, there are several others, which it is important to inquire into upon the first visit after delivery; among these may be named *the state of the excretions*. During the second stage of labor, perspiration becomes quite copious, diminishing after the delivery, but not immediately returning to the ordinary standard; sometimes it has a greasy feel, and a sickly odor, and the skin is soft and flabby, gradually returning to its natural state.

Particular inquiry should be made as to the *urinary discharge*, and on this point the practitioner should fully satisfy himself. It is frequently the case, that the patient is unable to void the urine, or it passes with difficulty, and in small quantity. This may distend the bladder, giving rise to pains, fever, violent spasms, and, perhaps, rupture of the bladder. Pressure of the head upon the bladder and urethra, during its passage through the pelvis, usually occasions this difficulty. Whenever there exists any want of free urination, the bladder should be at once emptied by means of a catheter, which may have to be used several times before the parts recover their tone sufficiently to do without it. In attending to the evacuations during the first twenty-four, or thirty-six hours after labor, the patient should never be allowed to rise in the bed; it has often been the case that a sudden rising up in bed, within a day or so after delivery, especially when this has been accompanied with hemorrhage, has been followed by immediate death. The late Professor Meigs considered this to arise from the "*heart clot*" emboly. The excessive loss of blood disposes the remaining portion of this fluid circulating in the system to a ready coagulation; consequently, if on rising, the debilitated patient should faint, the activity of the circulation is impeded, and a mass of coagulated blood forms in the heart, filling it so that the circulation can not be re-established, and death must ensue; or if this does not supervene, restoration takes place very slowly, with symptoms of restlessness, difficult respiration, and a peculiar action of the heart. Dr. Meigs says, that he has not seen a patient, struggling and breathing violently, from the above cause, who has ever recovered.

The *condition of the bowels* should likewise be inquired into; if the patient is doing well, and had a thorough alvine evacuation previous to delivery, there will be no necessity for any medication in two or three days, if at all. But, if the bowels were costive, or if there are febrile symptoms, restlessness, with slight pain upon pressure of the abdomen, some mild laxative medicine should be administered. If an enema can be given without worrying or exciting the patient it

may be employed in preference to the internal laxative; but on no account should the patient be actively purged, as it increases her already existing debility, favors absorption of any septic poison that may be present, and may give rise to some uterine displacement. Castor Oil is the agent most generally employed for this purpose, but many females have an aversion to it, consequently other laxatives will have to be used, as the compound powder of Rhubarb, calcined Magnesia, or one of the mild aperient waters may be substituted, as Hunyadi. Small doses of Cascara Cordial is a favorite with many. In fact, any one of the mild, non-irritating laxatives may be employed, when an agent of the kind is indicated. I have frequently been called to patients, several days after their delivery, who were suffering from pains in the abdomen, headache, restlessness, and febrile symptoms, caused by the medical attendant having neglected to evacuate the bowels, and in whom all these symptoms disappeared, after the action of a dose of mild purgative medicine. This inattention to the condition of the bowels of the puerperal female, appears to constitute a part of the practice of a certain class of physicians. It is, however, a very reprehensible omission.

The LOCHIA is a discharge consisting of blood, broken-down coagula, and decidual debris, which takes place from the partially closed vessels of that part of the uterine surface to which the placental attachment was formed, as well as from the naked surface of the uterus deprived of its decidual membrane; it generally lasts five or six days, or longer, until the womb is restored to its normal size; though with some females, the discharge continues until the re-appearance of the menses. It is, at first, bloody, but in twelve or thirteen hours becomes thinner and paler, changing to a discharge of bloody serum. According to its color, the lochia is distinguished by the names of sanguineous, sero-sanguineous, and purulent or puriform; it exhales a peculiar, disagreeable odor, varying in intensity with different women, which is called *gravis odor puerperii*. During the milk-fever, the discharge generally ceases, but returns on its subsidence, being then of a yellowish-white color; it varies in quantity, being with some women very small, while others will soil from six to fifteen napkins in the twenty-four hours; but this quantity gradually diminishes, and the discharge assumes a greenish or paler color before it ceases. The lochial discharge serves to relieve congestion, and to lessen the chances of an inflammatory attack; during fever, it becomes

checked, hence, its presence is indicative of the absence of fever. This flow is considered to bear a relation to the expulsion of the uterine contents, somewhat similar to that which exists between menstruation and the discharge of the monthly formed decidua.

Generally, the lochia requires no interference; it is only when its condition affects the health of the patient, that medical attention will be needed. Thus, it may be very small in quantity, but continue the usual time without any unpleasant results, and which is apt to occur after flooding; or it may be abundant, and cease at the usual time, without any detriment to health; or it may stop shortly after delivery, without any evil consequences, as is frequently witnessed in the case of still-born or putrid children. When this flow continues beyond fourteen or sixteen days, it is indicative of existing ulcerations of the cervix, of a check to the act of involution, or of both. Should these conditions be found, upon examination, to exist, astringent solutions may be locally applied to the vaginal walls and to the ulcerations, as, of Tannin, Borax, Chlorate of Potash, Asepsin, Persulphate of Iron, etc.; while, to forward uterine involution, agents should be administered internally that occasion contraction of uterine fiber, as, Ergot, Sulphate of Quinia, Macrotys, Cinnamon, Strychnia, etc.

Sometimes, however, the discharge is very *excessive*, producing much debility; in these cases, remedies must be employed which will diminish the quantity of the flow, as well as strengthen the patient's system. To check the discharge, astringents may be employed; Macrotys, Aletris, Pulsatilla, or the Parturient Balm may be given, as suited to each particular case. Perchloride or Persulphate of Iron will often prove serviceable, in dilute solution. I have also gotten good results from teaspoonful doses of a mixture of soluble Citrate of Iron; a drachm to the ounce of Port wine. As tonics, Quinine, preparations of Iron, or some of the ordinary vegetable bitter agents, may be used; the diet of the patient should be more nourishing, but not stimulating, and she should be kept in a state of rest and quietude. If, with the excessive discharge, there is vascular excitement, as quick pulse, heat of surface, furred tongue, pain in the back, etc., the patient should be placed on a low, mild diet, with cooling drinks, the bowels must be gently moved by Seidlitz Powders, or other cooling laxative, and the febrile symptoms may be overcome by the administration of Aconite, Gelsemium, or such other specific agents that may be especially indicated, prepared as usual, in the half-glass of water, and given in teaspoonful doses, every one or two hours. Macrotys will

be often called for, at which time the most satisfactory results will follow its use; it may be either given singly or with the sedative. Beside the sedative and antiphlogistic influence exerted on the system by these agents, we also obtain the peculiar tonic action of the Macrotys upon the uterus, thus rendering the compound a highly desirable one. The generative parts should be bathed with cool water, three or four times a day. Should the increase of the flow be owing to the presence of a portion of the placenta within the uterine cavity, and which may be presumed if the discharge is offensive, with vomiting, the vagina may be syringed two or three times daily with hot water, in which may be used Chlorate of Potash, Borax, Asepsin, or diluted Carbolie Acid, one to fifty or sixty parts of distilled Water, or, solution of Permanganate of Potash, one to one hundred or one hundred and twenty parts, etc., and if the offending portion can be easily removed it should be done, when the symptoms are very urgent. Should it become necessary to apply any of these to the inner uterine walls, it must be effected by a soft uterine probang, and not by injection; the greatest circumspection and care must be observed in making these applications. Generally, however, the uterus will evacuate its contents with more safety when not interfered with by injections or manual operations.

At times, the lochial flow, after having diminished in quantity, suddenly becomes increased and of a red color; this arises from the patient sitting up too soon, or, at a later period, from too much exercise, as of walking. Rest in the recumbent position will, usually, be the only treatment needed; but should it prove obstinate, the red discharge still continuing, secondary hemorrhage may ensue, for which the practitioner must be prepared; Ergot, Cinnamon, Macrotys, Pulsatilla, etc., are among the articles that may be used in these instances, together with a confinement to the horizontal position. Some of the astringent preparations of Iron may frequently be employed with benefit in these cases.

The lochia may be *checked*, or *deficient in quantity*, from other causes than uterine contraction, in which cases febrile symptoms will be present; and if the discharge be not promptly restored, it may form the basis of some fatal disease. The treatment which I have found to be most commonly beneficial, is, to evacuate the bowels by a mild purgative, after which the sedatives and other agents usually indicated where we have febrile excitation should be given; at the same time bathing the groins, thighs, and inferior extremities with

the officinal compound tincture of Camphor has been recommended. Hot fomentations to the abdomen have also proved serviceable.

When the above treatment fails to remove the abnormal symptoms, they may be owing to inflammation of the uterus, or other local inflammation, which will require to be treated upon general principles. I would remark here, however, that the combination of the Sp. Tr. of Aconite and Macrotys, above mentioned, with attention to the condition of the bowels, and warm fomentations to the abdomen, have been employed in my own practice very successfully. I have also administered the tincture of Gelsemium, in these cases, with the most remarkable results. A similar course may be pursued where the diminution of the lochial discharge is owing to uterine rheumatism; which is apt to be the case when the uterus is attacked by this disease.

Sometimes the lochia has a very fetid odor, is acrid, and of a dark color; this may be owing to putrefaction of retained coagula, or decomposition of pieces of the placenta or membranes which have been left within the uterus. An injection of hot water, with the addition of an astringent, or of a very weak solution of chloride of lime, passed into the vagina two or three times daily, will be found sufficient to remove the feter. Or, weak solutions of Chlorinated Soda, of Permanganate of Potassa, or of Carbolic acid may be injected into the vagina, as well as sprinkled upon that part of the bed in the vicinity of the reproductive organs. When the discharge continues of a purulent character, long after delivery, with lumbar pains and sense of weight accompanying, it may be owing to ulcers, or abrasions of the cervix or vagina, which will have to be determined by the speculum, and treated accordingly. When the lochia is acrid, an infusion of Elm bark and Black Cohosh root, may be injected into the vagina, several times a day, with advantage.

With some women the *secretion of milk* is attended with considerable vascular excitement; rigors, headache, pains in the back and limbs, quick pulse, furred tongue, etc., are present in a greater or less degree. This condition is termed *milk-fever*, and is by no means common to every parturient woman; it usually manifests itself in two or three days after delivery; occasionally sooner, and sometimes later. It may generally be avoided by placing the child to the breast as soon after labor as is compatible with the strength and condition of the mother, and by the early administration of a mild purgative. It commonly

lasts for twelve or twenty-four hours, rarely forty-eight, and may be overcome by the use of cooling purgatives, fomentations to the breasts, if they are full, hard, and painful, and the frequent application of the child. When very severe, diaphoretics or sedatives may also be given. When the rigors are very intense, or when the fever assumes periodicity, febrifuges and antiperiodics must be administered, and the practitioner should be on his guard lest it be attended with puerperal peritonitis.

Milk-fever is often occasioned, or aggravated by too long a delay in giving suck to the child, and which may arise from deficient, malformed, or sore nipples. Where the nipples are deficient or malformed, the milk will have to be extracted by artificial means, as the breast-pump. The secretion of milk is liable to become diminished when the uterus is suffering under a rheumatic attack; and this, together with the severe pain, diminution of lochia, pain on pressure, etc., may be readily taken for peritonitis. From recent investigations it seems more probable that the symptoms, to which the name of "milk-fever" has been applied, are in no way associated with the secretion of milk, but are rather the result of a mild form of puerperal septicemia arising from absorption of any putrid lochia that may be present within the uterus or vagina, and may be remedied by keeping up proper uterine contraction, with cleanliness, antiseptics, and tonics or febrifuges as required.

Excoriation and ulceration of the nipples is a very common affection among nursing women, indeed, some suffer severely from it after every confinement. It is, sometimes, so severe and painful that it is impossible to bear the application of the child's mouth to the nipple, and, in some instances, a persistence in suckling, gives rise to large, foul, painful, superficial ulcers, or deep cracks, which bleed upon every application of the child; occasionally, the woman loses her nipple. This difficulty may be obviated, by the use of artificial shields, or prepared teats, which can be had in every drug-store; but frequently the child refuses to suck with them, and the aid of the physician is demanded. Whenever inflammation is present, it must first be subdued, previous to the application of any healing salve or ointment. This may be effected by a poultice of Elm bark, or Flaxseed, which should cover the whole nipple and areola, after which any of the preparations named below may be applied. Sometimes, the inflammation will be so intense, as to require the application of a few leeches on the breast outside of the areola, before any benefit will result from the emollient poultices. The severe pain may frequently be relieved by a careful

application of a solution of Nitrate of Silver to the excoriated parts only; the solution may be of the strength of from two to six grains of salt to the fluidounce of water.

After the reduction of the inflammation, and in those cases where it is but slight, the following applications have been recommended: 1. Take of Spermaceti Ointment, six drachms; Balsam of Peru, one drachm; mix together, and apply a small portion to the nipples, several times a day. 2. Take of Mutton Suet, one ounce; Balsam of Peru, two drachms; Honey, Glycerin, of each, one drachm; melt the Suet, and add the remainder of the articles, stirring well together. Use same as above. 3. Take of Balsam of Tolu, Balsam of Peru, Honey, of each, fourteen drachms; Camphor, Opium, of each, two drachms; Alcohol, two pints; mix together and allow them to stand for seven days, frequently agitating them. A piece of linen is to be moistened with this, and kept constantly applied to the nipple when the child is not suckling; if too severe, it may be slightly diluted with water. It must be washed off every time previous to the application of the child. I have used this successfully, in many cases. 4. Take of Beef-marrow, Olive Oil, white Wax, of each two ounces; Cherry Wine, made of common cherries (*Cerasus avium*, *C. vulgaris*, etc.), two fluidounces; place the articles together in a vessel, apply it over a gentle heat, and allow it to remain until all the wine has evaporated. This ointment may be applied just previous to the child's suckling, and immediately after. Should the child's mouth be sore, this will have a tendency to heal it. It forms an elegant preparation, one which I have successfully employed in the most distressing and obstinate cases. And as my object is to render this work one of practical utility, even in minor difficulties, I do not hesitate to give publicity to these small details. 5. Take of Glycerin, Tannin, each, two drachms; mix, dissolve the Tannin, and apply frequently. 6. Take of Gum Tragacanth, 8 to 15 parts; Lime water, 120 parts; Glycerin, 30 parts; Rose water, 100 parts; mix, and employ in ointment or embrocation. The agents I more commonly employ are, however, No. 3, of the preceding, and diluted Carbolic acid, or Carbolate of Soda. I have frequently been called upon to prescribe in cases of sore nipples, which had baffled the treatment of four or five preceding medical attendants, but which yielded at once to the course above named.*

* The above named formulæ are old; most of them are taken from the Am. Dispensatory. They, however, will be found quite efficient, and may be used where other means fail. A cure, in most cases, will follow the application of Glycerole of Tannin.

After having bestowed the proper attentions to the mother, and ascertained the condition of the bowels, bladder; uterus, lochia, pulse, breasts, etc., the practitioner may then inquire concerning the child. Whether it has had evacuations from the bowels and bladder, and whether it sucks. In cases where the urine is scanty, or where there has been no urinary discharge, and the parts are natural, requiring no surgical operation, a warm bath, cold water sprinkled upon the hypogastrium, or the administration of one of the diuretic infusions, will be very serviceable; if, however, these do not cause a copious urinary discharge, and the hypogastric region be swollen from accumulation of fluid in the urinary bladder, it may become necessary to introduce a small flexible catheter, in order to remove the urine, and which will be found a difficult operation, requiring great care. If the bowels have not been evacuated, and there is no imperforate anus requiring the surgeon's aid, a mild laxative as before remarked, may be given; Castor Oil is usually preferred, though I prefer Sweet Oil in almost every instance. The light should not be too intense for the delicate eyes of the child, but should be kept subdued for several days after birth, gradually accustoming these organs to ordinary daylight. The clothing of the child should be warm, and loosely applied, that it may be free in its motions; caps are to be avoided as injurious; the dress should be high up on the neck, with long sleeves; and the diapers must be soft, and never allowed to become dry and stiffen with the excretions, and thus give rise to troublesome excoriations.

The only proper food for an infant, is its mother's milk, and when this can be obtained, little else should be given it, for at least six or seven months. All paps, panadas, gruels, and cordials are to be avoided, and their use among infants, as food, can not be too severely censured. Colics, diarrheas, green and watery stools, and severe aphthous affections are the penalties of such unnatural practices. When the mother's milk can not be had, from whatever cause, and a wet nurse is not at hand, and it becomes necessary to feed the child, a mixture of one part of water to two or three parts of cow's milk, and warmed, forms an excellent substitute for the parent fluid. The milk used should be procured from one healthy cow regularly, and be given as soon as possible after it has been milked out. The addition of cane sugar to the preparation, as advised by some writers, I consider uncalled for and pernicious, frequently producing diseases of the stomach and bowels, which are attributed to other causes. If sugar is at all desired as an addition, it should be sugar of milk alone.

The following table, by Simon, showing the mean of fourteen analyses, made at different periods, with the milk of the same woman, and which very nearly corresponds with the analyses of other investigators, will conclusively show the folly of adding sugar to a preparation intended to supply the place of breast-milk:

Water	883.6
Solid constituents	116.4
Butter.....	25.3
Casein.....	34.3
Sugar of milk, and extractive matters.....	48.2
Fixed salts.....	2.3

And as to the sugar of milk, it very nearly corresponds in quantity to that of cow's milk, as may be seen by the following analysis of this animal's milk, by Chevallier and Henri:

Casein.....	4.48
Butter.....	3.13
Sugar of milk.....	4.77
Saline matter	0.60
Water	87.02

It will be observed that cow's milk contains more casein and butter than human milk, which may, probably, lead to the production of a still better substitute for this last, than the one proposed above.

In feeding the child its artificial food, it should be done in a manner to simulate, as closely as possible, the natural functions; that is, it should not be fed with a spoon, but should be taught to suck from a vessel, through some porous substance, by which means the saliva is invited into the mouth to be swallowed with the food, which latter is thereby rendered more easily digestible.

The parturient woman should be kept in a state of rest and quiet for nine or ten days, in order that the process of involution may progress uninterruptedly, or in other words that the uterus may return to its non-gravid size, without hemorrhage, inflammation, or displacement, and that the system may fully recover from the shock given to it by the labor. The first two or three days, she must not be allowed to remove from the horizontal position (though she may move around in bed), especially if the labor has been protracted, or if there has been hemorrhage; after this time, if not contra-indicated, she may be permitted to sit up in bed a few minutes at a time, or in a

chair, while the bed is being fixed, and should from this time lengthen the duration of sitting each day, until there is no further occasion for remaining in the bed. But in this matter, the judgment of the accoucheur based upon the conditions present must, after all, decide the proper degree of motion to allow the patient; some strong, healthy women may sit up and even walk about in a day or two subsequent to labor, while delicate and weak females, or those who have been much enfeebled by a prolonged labor, hemorrhage, etc., will require rest and quiet in the recumbent position for three or four days, or even longer. Too much rest in bed relaxes muscular fiber and weakens nerve power, while proper movements tend to equalize the circulation, to remove passive uterine congestion, and to excite the contractile power of the uterus sufficiently to enable it to expel any putrid lochial clots that may form within its cavity, and thereby tend to the avoidance of septicæmia. Where there is a sense of fatigue, weariness, mild stimulation will prove beneficial.

The room should be well ventilated, but without exposing the patient, and be kept clean, quite free from all unpleasant odors, and moderately warm. The female should be kept clean, especially about the genitals, which must be frequently bathed with lukewarm water, or warm water and spirits; and her diet must be light, nutritious, and of easy digestion, especially during the first days. Gruel, mush and milk, toast, panada, arrowroot, rice, etc., are all that is usually permitted until the fifth or sixth day, when, if she be doing well, the use of soft-boiled eggs, oysters, and weak soups, may be allowed. After the tenth day, and during the puerperal month, animal food, fowls, and other diet of a nourishing but non-stimulating character, may be given; if she be weak, a little porter will be admissible. However, it will more frequently be found that a compliance with the desires of the patient, as to diet, will answer a much better purpose, than any arbitrary rules that can be laid down, when such desires are not morbid or otherwise contraindicated.

If the patient, previous to pregnancy, was afflicted with prolapsus uteri, an intermittingly continued recumbent position [but not necessarily in bed] for eight or ten weeks after delivery, together with Sulphate of Quinia, Macrotys, Pulsatilla, Aletris, Strychnia, etc., internally, according to the indications [to improve the tone and condition of the uterus], will contribute much toward a radical cure; the medical man observing that the uterus is kept in position during the intervals of sitting or standing.

The visits of the practitioner should be daily, for the first two or

three days, or oftener, if required ; after which, a visit every second or third day, made on two different occasions, will be sufficient in ordinary cases. However, this is governed by custom ; in some places, after the first visit succeeding delivery, no other is made, unless the physician is sent for ; in others, the visits are continued more or less often, as may be required, until the ninth or tenth day. I consider the last-named plan of visiting, the preferable one, both as regards the safety of the woman, and the reputation of the accoucheur. If, after the fourth or fifth week from parturition, the patient suffers from pains in the back and loins, debility, profuse leucorrhea, irritable bladder, with more or less straining and tenesmus, and perhaps some hemorrhage, we may be led to suspect defective involution, and if examination confirms our suspicion, we should at once pursue the treatment necessary to remove the subinvolution, which consists, in some cases, of gently stimulating vaginal injections, together with uterine tonics, as Macrotys, Pulsatilla, Aletris, Parturient Balm, etc.

CHAPTER XXVII.

PRESENTATIONS AND POSITIONS.

FOR the purpose of more clearly understanding the mechanism of labor, it is necessary that a knowledge of the various presentations and positions of the fetus, be had. By the term *presentation*, in obstetrics, is meant the part of the fetus which occupies the pelvic superior strait at the commencement of labor ; while *position* designates the relations which the presenting part assumes with the circumference of this strait, or with some fixed point. Thus, if it is said *the vertex presents*, we understand it to mean a presentation of the head, in which the head of the child will be the part first delivered ; if it is still further said, that it is in *the left occipito-anterior position*, we learn that the occiput of the child looks toward the left acetabulum of its mother, while its forehead is toward her right sacro-iliac symphysis, and the sagittal suture will consequently be found running in an oblique direction in the pelvis between these two points—or, in other words, we have the *position* in which the head *presents*.

There are two PRESENTATIONS recognized in obstetrics—one

Cephalic, the other Pelvic. The cephalic, is divided into vertex, face, and shoulder presentations; the pelvic, into breech, knees, and feet. Occasionally, some portion of the trunk may present, or perhaps the ear and side of the head, but these are so extremely rare, as to form exceptions rather than exemplifications; and their management would be similar to that recommended for arm or shoulder presentations.

The most common, as well as the most favorable presentation for both mother and child, is that of the vertex or head, and which alone constitutes a natural labor; the others are only deviations. That this is the fact may be gathered from the following statistics: Bland records 1792 head presentations in 1897 cases of labor; Dubois 10,262 in 10,742; Kluge 257 in 298; Lovati 61 in 67; Mazzini 439 in 452; Nægèle 1210 in 1296; Pacord 49 in 53; Ramoux 266 in 275; Riecke 214,134 in 219,258; Siebold 132 in 137; Smellie 920 in 1000; and Velpeau 392 in 400.

The relative frequency of the various presentations, are given in the following table, taken from Churchill's Obstetrics,

Author.	Total No. of cases.	Head presentations.	Breech presentations.	Inferior extremities.	Superior extremities.
Mad. Boivin.....	20,517	19,810	372	238	80
Mad. La Chapelle.....	15,652	14,677	349	255	68
Dr. Jos. Clarke.....	10,387	9,748	61	184	48
Dr. Merriman	2,947	2,735	78	40	19
Dr. Granville	640	619	2	3	1
Edin Hospital.....	2,452	2,225	17	8	4
Dr. Maunsell.....	839	786	—	21	4
Mr. Gregory.....	691	645	14	7	4
Dr. Collins.....	16,414	15,912	242	187	40
Dr. Beatty.....	1,182	1,105	28	15	4
Dr. Lever.....	4,666	4,266	59	29	12
Dr. Churchill.....	1,640	1,119	35	22	9

The POSITIONS of the two presentations and their divisions or deviations, vary considerably, so much so that some authors have given one hundred and two distinct positions. (*Baudelocque*.) But these have recently been so reduced and simplified by Nægèle, Dubois, Stoltz, and other accoucheurs, that the whole of them may be comprised in sixteen positions, and which will be found fully sufficient for all practical purposes. The many slight alterations and deviations in position, which may occur with the several presentations, and which have given rise to the numerous positions above referred to, may, singly, either be reduced to some one of the distinct positions, hereinafter named, before the termination of labor, or may hold such

a close relation to it, as to require no material difference in its management.

In a VERTEX or CRANIAL PRESENTATION, although it may become necessary to determine the situation of the anterior and posterior fontanelles, and the direction assumed by the sagittal suture, in order to ascertain its position, yet it is the posterior fontanelle alone, which distinguishes the situation of the occiput; and this fontanelle, in all natural labors, is the most readily reached by the finger. A vertex position is characterized by the relation existing between the occiput of the fetus, and the acetabulum, symphysis pubis, or sacro-iliac symphyses of the maternal pelvis. Thus, then, the positions of a vertex presentation, may be arranged as follows:

POSITIONS OF THE VERTEX OR CRANIAL PRESENTATION.

1st. LEFT OCCIPITO-ANTERIOR, in which the occiput of the child looks toward the left acetabulum of the mother, or anteriorly and to the left of the pelvis. In this position the forehead of the child, and consequently the anterior fontanelle, will be found toward the right sacro-iliac symphysis, the sagittal suture running obliquely across the pelvis anteriorly from the left, to the right posteriorly. This position has also been called the *left occipito-cotyloid*, or *first (oblique) cranial position*.*

2d. RIGHT OCCIPITO-ANTERIOR, in which the occiput of the child looks toward the right acetabulum of the mother, or anteriorly and to the right of the pelvis. In this position, the anterior fontanelle will be found toward the left sacro-iliac symphysis, the sagittal suture running obliquely across the pelvis anteriorly from the right, to the left posteriorly. This position has also been called the *right occipito-cotyloid*, or *second (oblique) cranial position*.

3d. OCCIPITO-PUBAL, in which the occiput faces the symphysis pubis of the mother, or is placed anteriorly without any lateral obliquity. In this position, the anterior fontanelle will be toward the

* I see no necessity for the changes in name which some authors have given for the various positions in which the head, or other parts of the fetus, may present. The names which I still adhere to, and which originated with eminent obstetricians, appear to me to convey a clearer and much better understanding of the positions than any others that have yet been proposed as substitutes. Indeed, the new terms attempted to be introduced by recent writers are not only more apt to confuse the student and practitioner, but are, certainly to my mind, very unsatisfactory. The term *left occipito-anterior*, will much better convey to the mind of the accoucheur the fact that the occiput is to the left anteriorly, than the term *first cranial position*.—K.

sacrum, the sagittal suture running in the direction of the antero-posterior diameter of the pelvis. This position has also been called the *first (direct) cranial position*.

4th. LEFT OCCIPITO-POSTERIOR, in which the occiput looks toward the left sacro-iliac symphysis of the mother, or posteriorly and to the left of the pelvis. In this position, the forehead of the child, or its anterior fontanelle, will be found toward the right acetabulum, the sagittal suture running obliquely across the pelvis anteriorly from the right, to the left posteriorly as in the second position. This position has also been called the *right fronto-cotyloid, or third (oblique) cranial position*.

5th. RIGHT OCCIPITO-POSTERIOR, in which the occiput looks toward the right sacro-iliac symphysis of the mother, or posteriorly and to the right of the pelvis. In this position, the forehead of the child, or its anterior fontanelle, will be toward the left acetabulum, the sagittal suture running obliquely across the pelvis anteriorly from the left, to the right posteriorly, as in the first position. It has also been called the *left fronto-cotyloid, or fourth (oblique) cranial position*.

6th. OCCIPITO-SACRAL, in which the occiput faces the sacrum of the mother, or is placed posteriorly without any lateral obliquity. In this position the anterior fontanelle will be found toward the symphysis pubis, the sagittal suture being in the same direction as in the third position. This has also been called the *second (direct) cranial position*.

The student can readily master a knowledge of these positions, if, taking the vertex or occiput as the guide, he will bear in mind, that it may be placed either *anteriorly* or *posteriorly* in the maternal pelvis, and that, commencing with its anterior position as the first, he has merely to give to it the directions, *left, right, and front*. Thus, vertex to the left anterior, vertex to the right anterior, vertex anterior, vertex to the left posterior, vertex to the right posterior, and vertex posterior. Professor Meigs simplifies the positions, the better to impress them upon the student's mind, thus: "vertex left, vertex right, vertex front; forehead left, forehead right, forehead front," and which enumeration is, undoubtedly, as he remarks, "the easiest one to remember." The importance of a knowledge of these positions, is, that in cases where an interference is demanded, the accoucheur may have a certain guide by which to govern his operations, with an eye to the safety of the mother, as well as of the child; and, without this knowledge, any assistance which may be attempted, is more likely to

effect mischief than benefit. And I hold a man, who is ignorant of these matters, criminally responsible for any fatal consequences that may follow his rash attempts to accomplish—*he knows not what*. Nor is the excuse, “that he has no malice or evil feeling toward his patient, but was endeavoring to do the best he could for her,” a valid one—he has no right, whatever, even with the authority of a diploma, to undertake a practice which concerns health and life, with an entire ignorance of his duties; the very attempt alone, is, in my estimation, criminal.

More recently writers have given but four positions, the first or left occipito-anterior; the second or right occipito-anterior; the third or left occipito-posterior; and the fourth, or right occipito-posterior. The other positions, four in number, occipito-pubal or sacral, and left or right transverse vertex positions, from their rare occurrence, and from the fact that they must assume an oblique position before the head can be born, unless it be very small as compared with the maternal pelvis, are merely referred to. Yet as the first mentioned do sometimes occur, I think it proper to recognize them. The transverse positions, as far as my own experience is concerned, are nothing more than positions which are incidentally encountered during the movement of the head toward an oblique position.

When the head presents well flexed, it is a vertex presentation, but when extension has occurred, it then becomes a **FACE PRESENTATION**, in which but two positions are recognized. In the diagnosis of face positions, the mentum or chin of the child, must be taken as the guide.

Although the labor in face presentations is tedious, and more painful to the mother, and somewhat more dangerous for the child than in vertex presentations, yet we find that in the majority of cases they terminate naturally, and without any artificial aid. From statistics collected from French, German, and English authorities, it appears that in 136,123 cases, the face presented in 640 or about 1 in 212½ cases, so that these deviations of the natural vertex presentation are very rare. As to the labor, we have a record of 344 cases, in which 248 were delivered naturally, 42 required version, 20 the forceps, and 15 craniotomy. The mortality to the mother averages about 1 in 50; to the child 1 in 7; and it has been found the greatest to both mother and child in those cases where assistance was given; so that the necessity for interference is not so great as was formerly supposed.

POSITIONS OF FACE PRESENTATIONS.

1st. LEFT MENTO-ILIAC, in which the child's chin is to the left side of the maternal pelvis, and its forehead to the right side. This is also termed the *second* or *left face position*.

2d. RIGHT MENTO-ILIAC, in which the chin of the child is to the right side of the mother's pelvis, and its forehead to her left side. This is also termed the *first* or *right face position*.

Some authors give two other positions, one the *mento-sacral* or *fourth face position*, in which the chin is toward the sacrum or nearly so, and the forehead toward the pubic symphysis, and the other, the *mento-pubic* or *third face position*, exactly the reverse of the preceding one. The former is said to be extremely rare, and I very much doubt whether it can occur, except in children with very small heads, or in premature labors. The latter is likewise seldom met with, although it is the position which the two principal positions assume at the termination of labor. For practical purposes the two positions above named are sufficient. The right mento-iliac position is much more frequently encountered than the left, and is commonly given by authors as the *first face position*; but, as I have commenced with the vertex presentation by giving the first position to the left, and the second to the right, I have considered it better to adhere to this arrangement with all presentations without regard to the frequency of any one position among them, and which certainly presents more uniformity and less complexity.

A SHOULDER PRESENTATION may be considered a deviation of the cephalic presentation, and includes those of the arm, elbow, and hand; according to statistics it has occurred 358 times in 93,398 cases, or about 1 in 260 $\frac{1}{4}$, and its mortality to the mother is about 1 in 9, while of the children rather more than one-half have been lost. There are four shoulder positions; two for each shoulder, and the points by which the practitioner is to be guided in his diagnosis, are, the head of the fetus, and the ilium of the mother; some authors name the back of the fetus instead of its head, while others again have two dorso-anterior, and two abdomino-anterior positions. The right arm or shoulder presents oftener than the left, and in the majority of instances, the back of the fetus will be looking toward the maternal abdomen. *First*, is the distinctive term applied to the two positions of the right shoulder presentation: and *second*, to those of the left.

POSITIONS OF SHOULDER PRESENTATIONS.

FIRST LEFT CEPHALO-ILIAC, in which the *right shoulder* presents, the head of the fetus being in the maternal left iliac fossa, its face looking posteriorly, and its back anteriorly. This is likewise called the *first dorso-anterior position*.

SECOND LEFT CEPHALO-ILIAC, in which the *left shoulder* presents, the head of the fetus being in the maternal left iliac fossa, its face looking anteriorly, and its back posteriorly. This is likewise called the *first dorso-posterior position*.

FIRST RIGHT CEPHALO-ILIAC, in which the *right shoulder* presents, the head of the fetus being in the maternal right iliac fossa, its face looking anteriorly, and its back posteriorly. This is likewise called the *second dorso-posterior position*.

SECOND RIGHT CEPHALO-ILIAC, in which the *left shoulder* presents, the head of the fetus being in the maternal right iliac fossa, its face looking posteriorly, and its back anteriorly. This is likewise called the *second dorso-anterior position*.

The PELVIC, or BREECH PRESENTATION, is divided into four positions, the sacrum of the fetus being the diagnostic guide. In this presentation, the delivery is generally accomplished by the natural powers, without the intervention of art, though it is slow, tedious, and painful to the mother, and more dangerous to the fetus than vertex, or face presentations; the mortality to the child is owing to pressure of the os uteri on its body, which, by forcing the blood toward its head, produces congestion of that organ; it may also be owing to the tardiness of the labor, and the compression of the cord during the delivery of the head. Why the breech should present, has not been satisfactorily explained. Breech presentations have occurred, according to statistics, 2,438 times in 129,117 cases, or about 1 in 52, and the mortality to the child is recorded at 195 deaths in 678 cases, or about 1 in 3½. Those breech presentations in which the back of the child is directed anteriorly, and which are more commonly encountered, are termed *first* positions; those in which the fetal back is directed posteriorly, are termed *second* positions. The other positions which have been given by former writers, as, sacro-pubic, sacro-sacral, etc., I have wholly omitted, as I doubt very much whether they really occur; but should they ever be presented to the accoucheur, he will be guided in their management, by the rules hereafter laid down. Knee and feet presentations are mere deviations from the breech, and

are even more tedious and dangerous to the child than this, on account of the delay in the delivery of the head, the maternal parts not being so well dilated, as when the breech presents, with the extremities flexed upward. Knee presentations are rare, occurring about once in 3,445 cases; statistics give 1,268 foot and knee presentations in 117,640 cases, or about 1 in 92½, and the mortality to the child is recorded at 210 deaths in 562 cases, or about 1 in 2½.

POSITIONS OF BREECH PRESENTATIONS.

1st. **FIRST LEFT SACRO-ILIAC**, in which the back or sacrum of the fetus looks anteriorly and to the left; its abdomen posteriorly and to the right; its transverse or bitrochanteric diameter occupying the right oblique pelvic diameter.

2d. **FIRST RIGHT SACRO-ILIAC**, in which the sacrum of the fetus looks anteriorly and to the right; its abdomen posteriorly and to the left; its transverse diameter occupying the left oblique pelvic diameter.

3d. **SECOND LEFT SACRO-ILIAC**, in which the sacrum of the fetus looks posteriorly and to the left; its abdomen anteriorly and to the right; its transverse diameter occupying the left oblique pelvic diameter.

4th. **SECOND RIGHT SACRO-ILIAC**, in which the sacrum of the fetus looks posteriorly and to the right; its abdomen anteriorly and to the left; its transverse diameter occupying the right oblique pelvic diameter.

In **KNEE PRESENTATIONS**, the feet are always to be brought down, and the positions of the feet (corresponding with those of the breech), are determined by the heel; thus, *first left calcaneo-iliac*, or heels to the left and front; *first right calcaneo-iliac*, or heels to the right and front; *second left calcaneo-iliac*, or heels to the left and posteriorly; *second right calcaneo-iliac*, or heels to the right and posteriorly. The position of the heels enables us more readily to determine the position of the breech.

To briefly recapitulate, the presentations and positions are as follows:

<i>Presentations.</i>	<i>Positions.</i>	<i>Presentations.</i>	<i>Positions.</i>
VERTEX.	1. Left Occipito-anterior.	SHOULDER.	1. First Left Cephalo-iliac.
	2. Right Occipito-anterior.		2. Second Left Cephalo-iliac.
	3. Occipito-pubal.		3. First Right Cephalo-iliac.
	4. Left Occipito-posterior.		4. Second Right Cephalo-iliac.
	5. Right Occipito-posterior.	BREECH.	1. First Left Sacro-iliac.
	6. Occipito-sacral.		2. First Right Sacro-iliac.
FACE.	1. Left Mento-iliac.		3. Second Left Sacro-iliac.
	2. Right Mento-iliac.		4. Second Right Sacro-iliac.

CHAPTER XXVIII.

MECHANISM OF LABOR.

It has been heretofore remarked, that presentation of the vertex is the most common of all—the mechanism of which includes descent, flexion; rotation, restitution and expulsion of the trunk; and among the positions, the *left occipito-anterior*, or that in which the occiput is directed toward the left acetabulum, is more frequently met with, occurring, according to statistics, about 69 times in every 100 cases. In 1,913 cases, reported by M. Dubois, 1,339 were left occipito-anterior, 494 right occipito-posterior, 55 right occipito-anterior, and 12 left occipito-posterior. Why the occiput is found so much more frequently in front is difficult to determine; but its position at the left anterior of the pelvis may be accounted for by the rectum on the left side, which, being usually distended with fecal matters, diminishes the right oblique diameter, so that the head being forced to traverse the most ample diameter, the occiput is thrown to the left acetabulum, and the forehead to the right sacro-iliac symphysis.

As already remarked, vertex presentations are always more favorable for both mother and child, than any other. The occipito-posterior positions are, however, less so than the occipito-anterior, in consequence of the difficult descent of the head, the more frequent demands for artificial aid, the greater liability of laceration, or perforation of the perineum, and from the delay in the advance of the head often creating sloughs, and urinary, or stercoral fistulæ.

The presence of a vertex presentation may frequently be recognized during the last few weeks of pregnancy, even before the finger can be introduced within the os uteri; a regular, solid, rounded tumor may be felt through the inferior portion of the uterine parietes, which can be raised by the finger with more or less difficulty as the pregnancy is more or less advanced. And when, at the commencement of labor, the presenting part can not be easily reached, or the round, resisting surface of the head is not encountered, there may be some other than a vertex presentation, and the labor should be closely watched during the first stage, in order to determine, as soon as possible, the nature of the presenting part, and be thereby enabled to rectify, at the proper period, any accidents which may present themselves. Nægèle states, that various circumstances, independent of malposition, may occur, which will prevent the presenting part from being felt at the end

of gestation; as in cases of multiparæ, where the uterine fundus is strongly inclined forward; in twin cases; in breech presentations; where a large quantity of amniotic fluid is present; where the uterus is not oval at its inferior part; when there is a hydrocephalous head; and where the pelvis is narrow. As soon as the dilatation of the os uteri has so far proceeded as to admit the introduction of the finger, during the absence of a pain, the large, rounded, smooth and solid surface of the head can be felt through the membranes, and if the dilatation be sufficient, membranous spaces, answering to the sutures and fontanelles, may be recognized; and if the head be pressed upon, a resistance of a somewhat elastic character may be noticed. But great care is necessary to prevent these examinations from prematurely rupturing the membranes. After the membranes have ruptured, at the close of the first stage, these diagnostic signs are more manifest.

After having correctly ascertained the presentation, the next thing will be to determine the position, and this should always be done at as early a period as possible, in order, the more readily to remedy any difficulties which may occur. The diagnosis can, in many instances, be effected previous to the rupture of the membranes; but, most frequently, it will be impossible to arrive at it, until after this has occurred, and then, it should always be accomplished without delay.

Auscultation has been spoken of, as affording aid in determining the position; thus, if the fetal heart is heard pulsating in the left iliac fossa, the occiput is to the left, and if in the right, it is to the right, etc.; but there is too much uncertainty in this mode of diagnosing, to admit of its employment in actual practice; the examination per vaginam is the only one on which dependence must be placed. The same may be said in relation to the active motions of the fetus, whose anterior region is supposed to correspond with the point of the uterus at which these have been recognized for a long time. The practitioner may attend to these symptoms, for the purpose of verifying their accuracy, or of leading to a more positive determination of their real value; but he should not allow a labor to proceed solely upon the indications they afford.

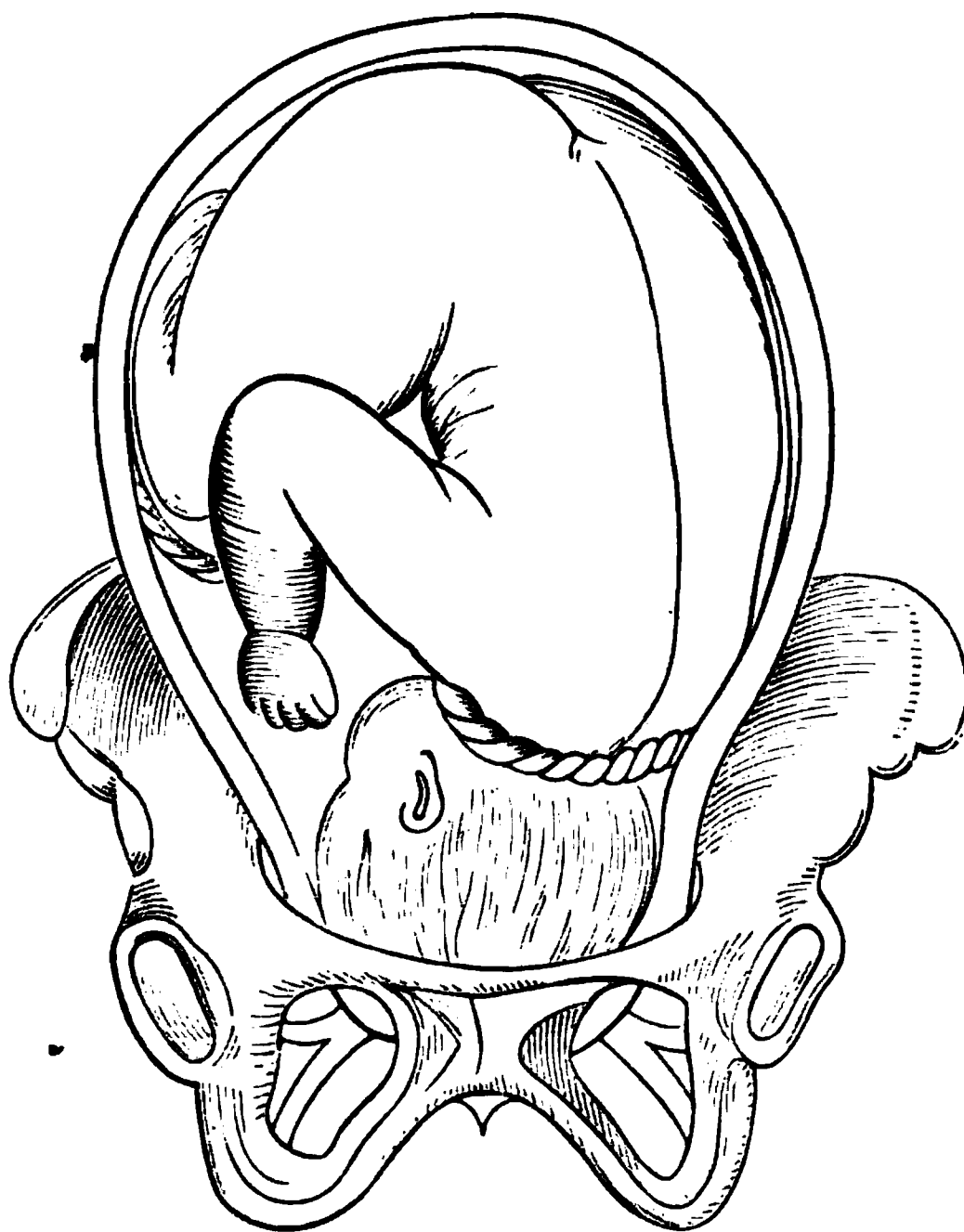
In order to arrive at the position of a vertex presentation, the accoucheur should render himself enabled to recognize at once, the character of the fontanelles and sutures, a description of which has already been given, and the exploring finger should be pressed with sufficient firmness upon the head to enable it to detect them. He must also bear in mind that, frequently, while the head is descending,

the compression it undergoes, is such, that the bones are **forced to** overlap each other, and the sutures, instead of a membranous sensation, convey to the finger, one of longitudinal ridges or prominences; and the distinctive character of the posterior fontanelle especially, is lost, being recognized merely by the junction of the sagittal and lambdoidal sutures, or rather the longitudinal prominences which they present from the pressure.

1st. LEFT OCCIPITO-ANTERIOR POSITION.

DIAGNOSIS.—In this position, the finger, upon being introduced into the vagina, or within the os uteri, will first come in contact with the boss or protuberance of the right parietal bone of the fetal head, which is the most depending part, and not the posterior fontanelle, which latter will be found in the region of, and corresponding nearly to the maternal left acetabulum; the sagittal suture may then be

FIG. 46



traced running from this triangular fontanelle, obliquely across the pelvis, from below upward, and from before backward, and from left to right, until it meets with the large, soft, membranous, and quadrangular anterior fontanelle, which will be toward the right sacro-iliac symphysis. The back of the child will be toward the front and left of the mother's abdomen, while its abdomen will be toward her back and right; its

right shoulder will be in front and to the right, and its left, back and to the left. (*Fig. 46.*)

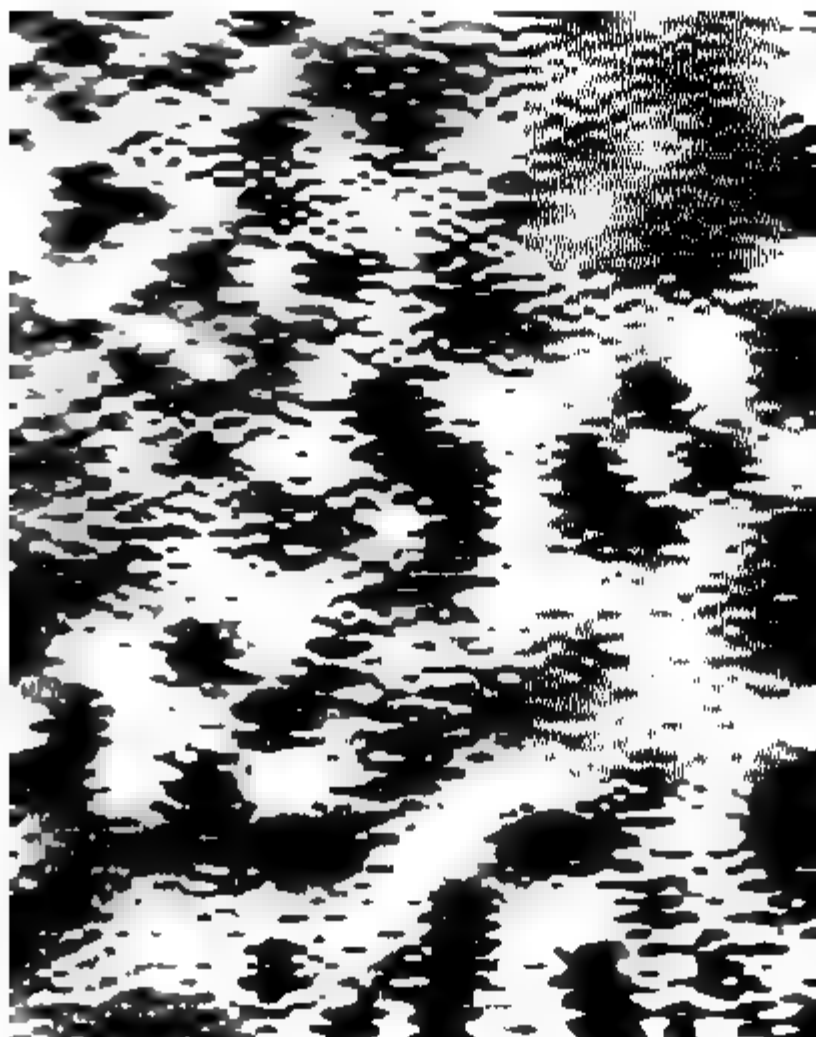
MECHANISM.—The waters having been discharged by the rupture of the membranes, the expulsive contractions of the uterus force the head, which presents obliquely at the superior strait, down into the brim of the pelvis, its flexion upon the chest is increased, so that the neck is bent more into a curve, and the body of the fetus is more or less compressed and rolled, as it were, into a ball, occupying much less space than before. At first, the two fontanelles are nearly on a level, but as labor progresses, and the head advances, one of them, more commonly the posterior, will be found gradually descending, as the uterine contractions cause the vertex to sink. The flexion causes a change in the relations of the head. Previous to the rupture of the membranes, and the flexion of the head, the occipito-frontal diameter of the fetal head was parallel to the left oblique diameter of the superior strait, and the biparietal of the former coincided with the right oblique of the latter; but now, while the position of the latter diameters remains unaltered, the former changes, the occipito-bregmatic of the fetal head corresponding to the left oblique diameter of the strait, in place of the occipito-frontal. The axis of the pelvis, which, previous to the rupture, coincided with the trachelobregmatic diameter of the head, now corresponds very nearly with its occipito-mental. If the student will compare the diameters of the fetal head with those of the maternal pelvis, he will ascertain that this movement of flexion, brings the smallest diameters of the head in correspondence with the smallest of the pelvis, thus placing it in a position highly favorable to its ready expulsion.

The *descent* of the head is due to the continuation of the uterine contractions, which force it through the strait, into the pelvic cavity, and onward to the lower strait of the pelvis. In its passage through the pelvic excavation, it undergoes great compression, the bones overlap each other, as above stated, forming longitudinal ridges along the sutures, and sometimes, when the pressure is very considerable, a tumor is formed upon the scalp, called the *CAPUT SUCCEDANEUM*. The obliquity of the head at the superior strait is preserved throughout its descent, with the exception that one fontanelle (the posterior) is, more commonly, lower than the other. The contractions urge the head downward, the occiput descends on the left antero-lateral inclined plane, while the forehead moves in the direction of the right sacro-iliac symphysis, and the descent is wholly perfected, when the occipito-bregmatic circumference coincides with the plane of the inferior strait, or when the two protuberances of the parietal bones have arrived at this level, and to attain which, the left protuberance, which

is behind, must traverse the whole anterior face of the sacrum, describing the arc of a large circle, while the right, which is anterior, traverses a shorter distance, describing the arc of a much smaller circle.

When the head arrives at the floor of the pelvis, its further progress is arrested by the perineum, sacro-sciatic ligaments, etc., etc., which

FIG. 47.



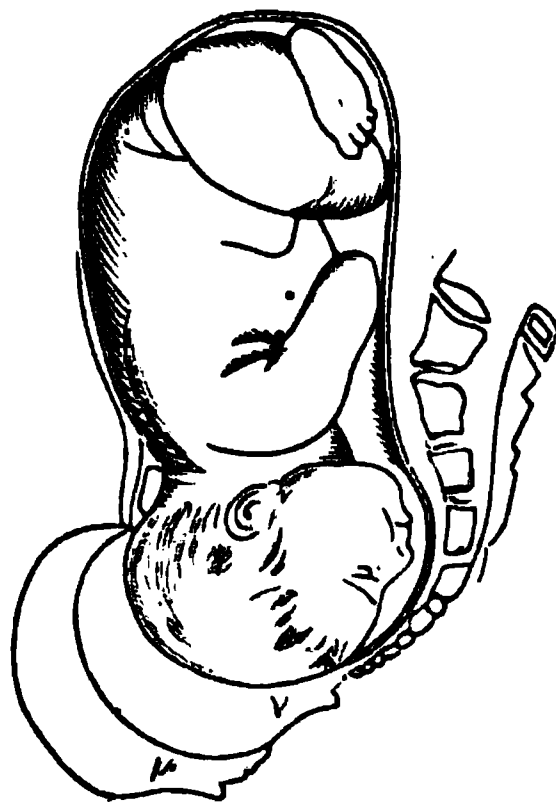
form this part; but the continuation of the uterine contractions effects a movement of rotation from left to right, in which the occiput is passed behind the symphysis pubis, a little to its left, while the forehead rotates into the hollow of the sacrum, remaining, however, a little to the right. (Fig. 47.) In this situation the occipito-mental diameter of the head is almost parallel with the axis of the inferior strait, and the sagittal suture

nearly coincides with the antero-posterior diameter of this strait. As the resistance at the floor of the pelvis is gradually overcome, the occiput continues to descend, passing under the arch of the pubis until the neck comes in contact with it, when its further advance is arrested. At the period when the occiput is engaged at the pubic arch, the shoulders and upper part of the body engage in the superior strait with their long diameters in the same direction as was taken by the biparietal diameter of the head, viz.: its right oblique diameter.

The neck being immovably fixed against the pubis, the contractile efforts being always in a line with the axis of the superior strait, are directed upon the chin, or that portion of the head which lies in the

concavity of the sacrum; the chin gradually departs from the chest, while the occiput ascends, forming the motion of *extension*. (Fig. 48.) During this extension, with the neck fixed against the symphysis pubis as a pivot for the head to turn upon, the forehead and face pass over the curves of the sacrum, coccyx, and perineum, and as the head emerges, the vulva becomes distended, the labia majora are effaced, the nymphæ are pressed up, the perineum becomes thin, yielding, and distended, and the sagittal suture, anterior fontanelle, forehead, nose, mouth, and chin, appear in succession at the vulva, and the head is born. It must be remarked here, that although the fetal head is impelled toward the outlet during each pain, yet each remission is followed by a recession of the head; and this may frequently be observed when the occiput, which has appeared at the vulva during a pain, recedes within the cavity during its cessation, having the labia closed over it. This recession is of immense benefit to the woman, as the distension of the parts is thereby relieved. Were the head to be forced onward without any such relief, the circulation in the parts would be obstructed, the vessels would be more or less strangulated, and inflammation, followed by gangrene, would be very apt to ensue. From a similar cause, it is likewise advantageous to the fetus, an undue and constant pressure upon the head of which, would be likely to cause its death.

FIG. 48.



The passage of the fetal head through the pelvic cavity is often accompanied with cramps in the inferior extremities, which do not, however, interfere with the action of the uterus or the progress of the labor, but are sometimes so agonizingly painful as to demand a hastening of the delivery with the forceps: the cramps are owing to the compression of the internal sacral nerves by the head.

A few seconds after the delivery of the head, it undergoes another motion, called *restitution*, in which it becomes directed as it was previous to rotation, that is, with the face looking toward the internal posterior surface of the right thigh of the mother, and the occiput toward her left groin. (Fig. 49.) From a supposition that the rotation was effected without any participation of the body therein, merely occasioning a twisting of the neck, and that after the birth of the

head, the neck untwisted, restoring the head to its natural relations

FIG. 49.

with the body, the term *restitution* was applied to this last motion. But, according to Gerdy, this view is erroneous, for the trunk does rotate with the head in such a manner as to bring the long diameter of the shoulders, which was at first in the direction of the right oblique diameter, to nearly correspond with the transverse diameter of the pelvic cavity. They descend and reach the

floor of the pelvis in this transverse position, which presents their bis-acromial diameter to the small, or bis-ischiatic diameter of the inferior strait, rendering it almost, if not quite impossible for them to be delivered. Consequently, the resistance offered to their further advancement, at this point, by the uterine contractions, as was the case with the head, establishes a rotation, which causes the right shoulder to pass from the right side toward the pubic arch, while the left passes into the concavity of the sacrum, and the bis-acromial becomes nearly coincident with the antero-posterior diameter of the inferior strait, and it is this rotation of the shoulders which causes the motion of the head called *restitution*; it necessarily following the impulse impressed on the shoulders.

Sometimes, however, the head executes a motion, a short time previous to its *restitution*, and which occurs immediately after its expulsion. This appears to be owing to a slightly oblique position of the shoulders, while the occiput is about passing under the pubes in an antero-posterior direction, which imparts a slight twist to the child's neck, and from which it is relieved, as soon as the head is delivered, and free from the soft parts.

Shortly after the expulsion of the head, the shoulders having executed the motions above named, the right shoulder appears at the vulva and is fixed against the pubes, while the posterior or left shoulder

traverses the perineal cavity in the same manner as the face in the delivery of the head, and after its disengagement at the anterior commissure of the perineum, the right or sub-pubic shoulder follows. During the birth of the shoulders, the trunk of the child becomes curved laterally, so as to correspond with the curvature of the pelvic excavation; the concavity being on its right side, and the convexity on its left.

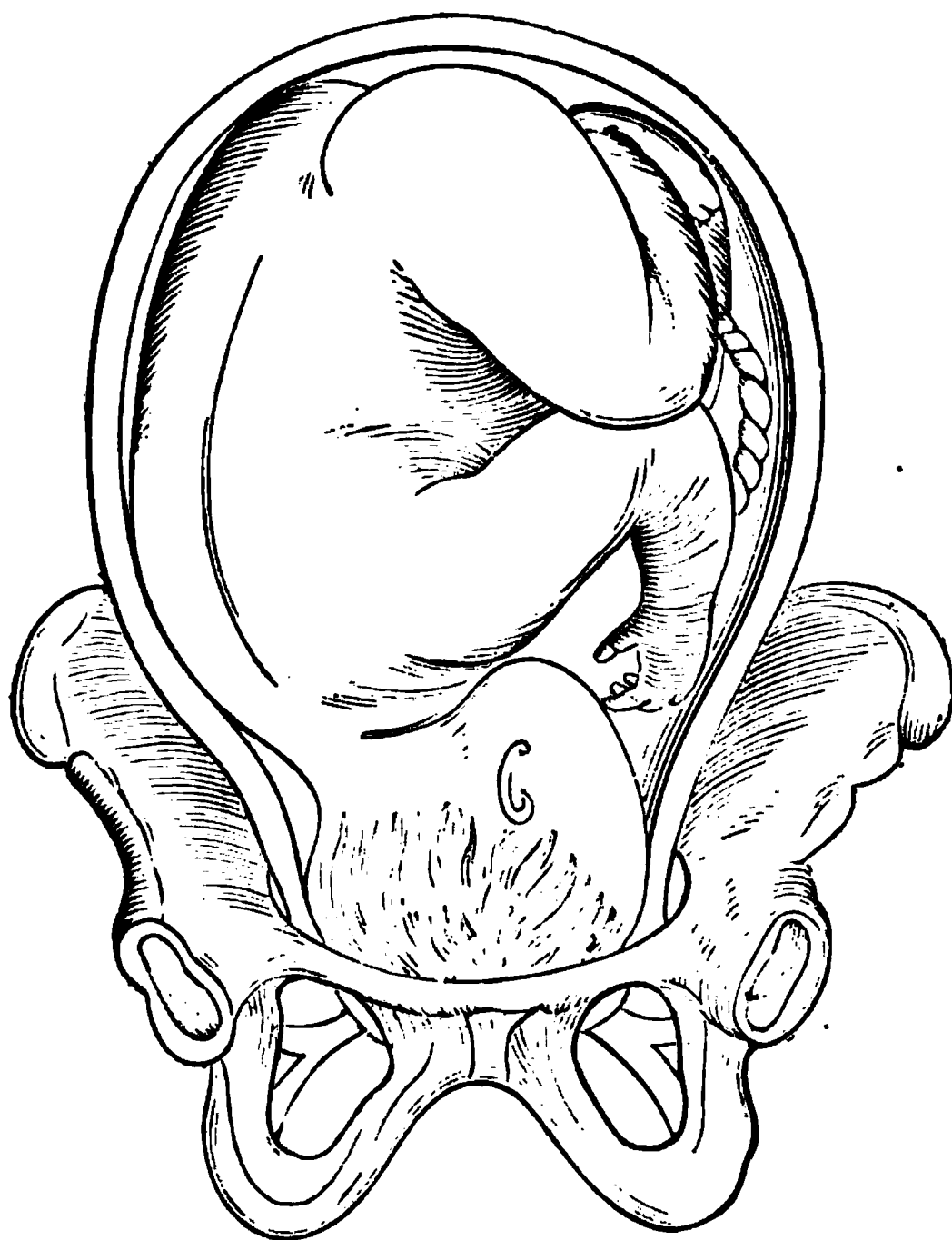
Frequently, the right shoulder will be the first delivered, or both shoulders may emerge from the vulva at the same time. After the delivery of the shoulders, the remainder of the body is easily expelled, describing in its passage, a more or less marked spiral movement.

Thus, then, in a natural labor, with an occipito-anterior position, we have the head to offer its smallest diameters and circumference to those of the pelvis, and to perform the motions of flexion, descent, rotation, extension and restitution. (*Fig. 50.*)

2D. RIGHT OCCIPITO-ANTERIOR POSITION.

DIAGNOSIS.—In this position, the finger will first come in contact with the left parietal protuberance, which is the most depending part, and the posterior fontanelle will be found corresponding nearly to the right acetabulum; from this fontanelle may be traced the sagittal suture, running obliquely across the pelvis from below upward, and from before backward, and from right to left, until it meets the anterior fontanelle, which will be toward the left sacro-iliac symphysis. The back of the child will be toward the front and right of the mother's abdomen, while its abdomen will be toward her back and left; its left shoulder will be in front and to the left, and its right, back and to the right. (*Fig. 51.*)

FIG. 51.



tal suture, running obliquely across the pelvis from below upward, and from before backward, and from right to left, until it meets the anterior fontanelle, which will be toward the left sacro-iliac symphysis. The back of the child will be toward the front and right of the mother's abdomen, while its abdomen will be toward her back and left; its left shoulder will be in front and to the left, and its right, back and to the right. (*Fig. 51.*)

Madam Boivin records 3,682 instances of this position in 20,517

cases, or about 1 in 54 cases. Nægèle states that though more cases are terminated in this position, yet that its frequency as an original one is .07 per cent. Between this and the previous position there will be found but little difference in practice. Dewees states that on account of the right lateral obliquity of the uterus prevailing so often, and the rectum being occasionally impacted with hardened feces, this position is less favorable than the first; but, he adds, we may control the obliquity by placing the woman upon her left side, and can empty the rectum by an injection.

MECHANISM.—In the right occipito-anterior position the occipito-frontal diameter of the fetal head is parallel to the right oblique diameter of the superior strait, and the biparietal of the former coin-

cides with the left oblique of the latter; but, as in the first position, when the membranes rupture and the head descends, the occipito-bregmatic diameter of the head takes the place of the occipito-frontal, the biparietal remaining unaltered. The flexion, descent, rotation, extension and restitution are the same as in the previous position, with the exception that rotation takes place from right to left, and restitution directs the face toward the internal posterior surface of the left maternal thigh, and the occiput toward the right groin. The delivery of the shoulders is likewise the counterpart of the first position.

3D. OCCIPITO-PUBAL POSITION.

DIAGNOSIS.—In this position the occiput, or posterior fontanelle, will be detected behind the symphysis pubis, and the sagittal suture may be traced [running parallel, or nearly so, to the antero-posterior diameter of the pelvis], from before backward and upward, until it meets the anterior fontanelle, which will be toward the sacrum. The back of the child will face the mother's abdomen, while its abdomen will be toward her back; its right shoulder will be toward her right side, and its left toward her left.

This position occurs but very rarely, though Nægèle considers it to be the original one in all occipito-anterior positions, these being merely secondary transformations of it, and recognized only because the examination is made at too advanced a period. Baudelocque met with it twice in 10,329 cases; Madam Boivin 6 times in 20,517; and Madam La Chapelle not once in 30,000.

MECHANISM.—In the occipito-pubal position, the occipito-bregmatic diameter of the fetal head corresponds with the antero-posterior pelvic diameter, and its biparietal with the pelvic transverse. The mechanism, when the head is small, as compared with the pelvis, differs from the two preceding positions, in the head executing only the motions of flexion, descent and extension; as rotation is unnecessary, and the direction of restitution will depend entirely upon which shoulder engages at the pubic arch, as rotation of the shoulders must ensue before they can be delivered. The labor, if not interfered with by any uterine obliquity which will remove the head from the center of the pelvis, will be as favorable as in either of the preceding cases.

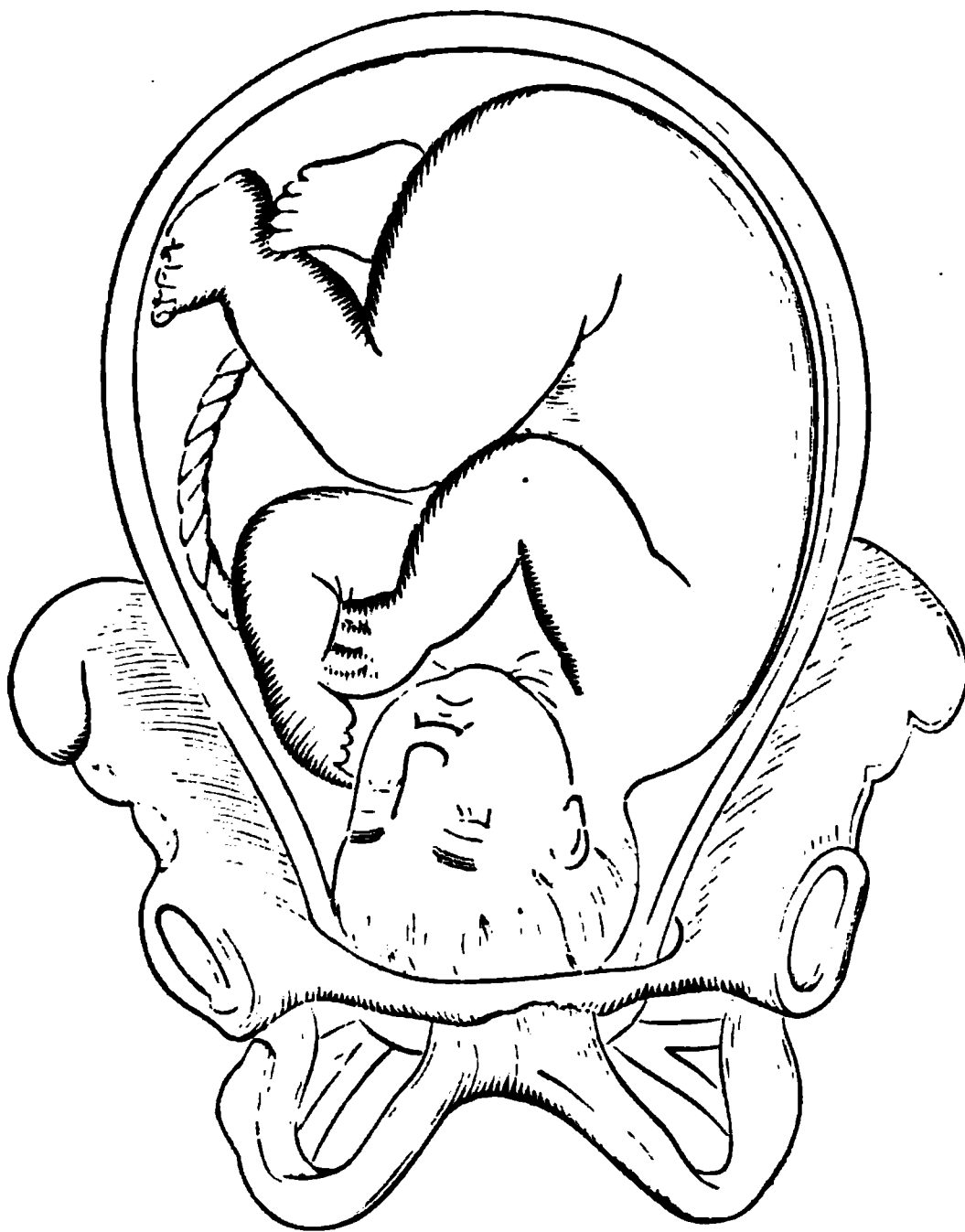
Labor may be facilitated, when the head is in this position, making but little advance, by changing it to one of the occipito-anterior

positions, especially when the vertex is high up, and manifests no disposition to assume one of these positions after the occurrence of three or four pains. To effect this change, the head may be grasped between the thumb and fingers, and the face inclined laterally; but the operation must not be attempted until the os uteri is well dilated, the soft parts yielding, and the head at the superior strait, not impacted, but free and movable, and during the absence of pain. If the change can not be effected, we must then wait until symptoms present themselves indicating the necessity of interference by forceps or otherwise. Indeed, when the head is large, unless it be changed, either naturally or artificially, to an occipito-anterior position, there will be but little progress in the labor.

4TH. LEFT OCCIPITO-POSTERIOR POSITION.

DIAGNOSIS.—In this position the occiput is placed at the left sacro-iliac symphysis, and the forehead at the right acetabulum. The

FIG. 52.



anterior fontanelle will be found behind the right acetabulum, from which the sagittal suture may be traced running obliquely across the pelvis, from before backward, and from above downward, and from right to left, until it meets with the posterior fontanelle, which will be toward the left sacro-iliac symphysis. The right parietal protuberance is the lowest in the pelvis, and the finger will come in contact with it the first. The back of the child will be toward the back of the mother and to the

left, while its abdomen will be toward her abdomen, and to the right; its right shoulder will be toward her abdomen and to the left, and its left to her back and right. (*Fig. 52.*)

This position is very rare, occurring, according to Nægèle, in the ratio of .03 per cent.; to La Chapelle of .04 per cent.; and to Boivin of .05 per cent. It is more unfavorable than the right occipito-posterior position, the labor being more painful and protracted; this arises from causes similar to those named under the second position, and may be remedied, to a certain extent, by the same means as therein mentioned.

MECHANISM.—If the examination per vaginam be made at an early period, before the head has undergone much flexion, the occipito-frontal diameter will be found to coincide with the right oblique pelvic diameter, and the biparietal with the left oblique. With the descent of the head, the same as in the previous positions, flexion takes place, which changes the situation of the head so as to bring the occipito-bregmatic diameter in correspondence with the right oblique diameter of the pelvis; and the occipito-mental diameter of the head runs nearly parallel with the axis of the superior strait. At first the anterior fontanelle will be found in the center of the pelvis, but as the head becomes flexed and descends it rises, while the posterior fontanelle, previously beyond the touch, descends, and engages in the pelvic cavity. The descent occurs in the same manner as already described in the preceding instances. When the head has reached the floor of the pelvis, rotation, which is much more extended than in the occipito-anterior positions, takes place, the occiput describes an arc from left to right, and is carried round to the symphysis pubis, through the left side of the pelvis, when the head is delivered in the same manner as if it had been an original anterior position: the first. This extensive rotation could not be effected with safety to the child unless the body participated in the motion, and which must, of course, require a long time to accomplish; but when completed the labor proceeds favorably, the right shoulder is soon brought under the pubic arch, and the left passed into the sacral concavity, and the delivery is terminated as usual. The movement of restitution places the face of the child toward the internal part of the right maternal thigh, and its occiput toward the internal part of the left thigh. It is often the case in this position, and especially in primiparous women, that, nature becoming exhausted, artificial assistance is demanded.

The above method is the one in which delivery is most commonly effected in the posterior occipital positions, but occasionally it occurs in another way. When the head arrives at the floor of the pelvis,

the rotation places the forehead under the symphysis pubis, and the occiput in the hollow of the sacrum. (*Fig. 53.*) In this position the face of the child will be to the front of its mother, and its back to her sacrum; the occipito-frontal diameter of its head will coincide with the pelvic antero-posterior, and the biparietal will be transverse, as well as the bis-acromial.

In this position, the uterine contractions still further increase the flexion of the head, the occiput is forced to gradually traverse the

FIG. 53.

sacral, coccygeal, and perineal curve, the perineum becomes greatly distended and elongated, the occiput passes over the posterior commissure, and the head passes out by its occipito-frontal diameter. As the occiput is passing outward, the forehead rises behind the symphysis pubis, thus giving more space for the head to pass through. Sometimes, after the delivery of the occiput, the neck becomes fixed against the perineum, and the forehead, face, and chin of the child,

successively, emerge from under the pubic arch. Should the forehead descend so low that the eyebrows may be felt, it will, by presenting an impediment to its elevation behind the pubic symphysis at the time of the passage of the occiput over the perineal curve, very much increase the difficulty of the labor.

Dr. Dewees states, "We almost always have it in our power to reduce this and the fifth" (when they occur with the occiput in the hollow of the sacrum, as just described), "one to the second, and the other to the first, and we should always do so when nature does not do it for us. Nor is this change of position of the head an operation of the slightest difficulty to the accoucheur; neither does it cause the smallest pain to the patient, provided advantage be taken of the proper conditions of the uterus, and head of the child, and state of the labor. For the uterus must be well dilated, the membranes ruptured,

the head occupying the lower strait, and the labor active. When these prerequisites obtain, the point of the forefinger must be placed against the edge of the sagittal suture either before or behind the anterior fontanelle, and, in the absence of pain, this part must be pressed toward the left sacro-iliac symphysis,* and maintained there during the subsequent contraction of the uterus. Should this attempt fail in changing the position of the head, by bringing the posterior fontanelle to the right acetabulum, the attempt must be repeated again and again until it succeeds, which it will almost constantly do."

The expulsion of the head in the occipital posterior positions may, in consequence of a premature extension, fix the occiput in the hollow of the sacrum, and thus the face be forced downward by the contractions, delivery occurring as in face presentations; but, in order to effect such a change in the pelvic cavity, the natural size of the head must be considerably reduced, or the diameters of the excavation must be very large.

In all the occipito-posterior positions there may be a failure of complete rotation, a want of energy of uterine contraction, or exhaustion, etc., either of which will require the interference of art.

5TH. RIGHT OCCIPITO-POSTERIOR POSITION.

DIAGNOSIS.—In this position the occiput is placed at the right sacro-iliac symphysis, and the forehead at the left acetabulum, the anterior fontanelle will be found behind the left acetabulum, from which the sagittal suture may be traced running obliquely across the pelvis, from in front backward, and from above downward, and from left to right, until it meets with the posterior fontanelle, which will be toward the right sacro iliac symphysis. The left parietal protuberance is the most depending part, and with which the finger will first come in contact. The back of the child will be toward the back of the mother and to the right, while its abdomen will be toward her abdomen, and to the left; its right shoulder will be toward her back and to the left, and its left to her abdomen and right. (*Fig. 54.*)

This is considered the most common of the occipito-posterior positions, and is stated by Nægèle to be the next in frequency, among the

* In the fourth position of the vertex, while attempting the above reduction, the forehead must be pushed toward the right sacro-iliac symphysis, which will reduce it to the first position; in the fifth position, the pressure must be made in the direction toward the left sacro-iliac symphysis, which will place the head in the second position.—*Author.*

vertex presentations, to the left occipito-anterior, occurring in the ratio of 29 per cent. In 355 cases, related by Simpson, 256 were in the first position, 1 in the second, 2 in the fourth, and 76 in the fifth. Its frequency is supposed to be owing to the same cause

FIG. 54.

which gives rise to the left occipito-anterior position, viz.: the pressure of the rectum on the left side of the pelvis, which happens especially when, as is common to women advanced in pregnancy, there is an accumulation of hardened feces. It is a more unfavorable position than the first three, and the labor, though generally accomplished by the natural powers, is more tedious and painful than with the occipito-anterior positions.

MECHANISM.—

This is the counterpart of the fourth position, and difficulties or changes may be encountered, similar to those met with in that position. At the commencement of labor, the occipito-frontal diameter will be found to coincide with the left oblique pelvic diameter, and the biparietal with the right oblique; the two fontanelles, as in the preceding case, being at nearly the same level. As the labor advances, flexion ensues, and the occipito-bregmatic diameter takes the place of the occipito-frontal, the axis of the superior strait corresponding nearly with the occipito-mental diameter. Flexion, descent, extensive rotation and restitution, occur as in the preceding case, with the exception that the rotation takes place from right to left, the occiput sweeping around the right side of the pelvis, the left shoulder is brought to the pubic arch, and restitution brings the face of the child toward the internal part of the left maternal thigh, and its occiput toward the internal part of the right

FIG. 55.

thigh—or, as in the preceding position, rotation may place the forehead under the pubic arch, and the occiput in the hollow of the sacrum, as shown in *Fig. 55*.

6TH. OCCIPITO-SACRAL POSITION.

DIAGNOSIS.—In this position the forehead or anterior fontanelle will be detected behind the symphysis pubis, and the sagittal suture may be traced [running parallel or nearly so, to the antero-posterior diameter of the pelvis], from before, backward, and downward, until it meets the posterior fontanelle or occiput, which will be toward the sacrum. The back of the child will face the mother's back, while its abdomen will be toward her abdomen; its right shoulder will be toward her left side, and its left toward her right.

This position is of very rare occurrence, so much so that its existence is doubted by some accoucheurs, and, together with the third, it is not classified as a position by several authors. In 20,517 deliveries it was met with but twice.—*Boirin*.

MECHANISM.—In the occipito-sacral position, the occipito-bregmatic diameter of the fetal head corresponds with the antero-posterior pelvic diameter, and its biparietal with the pelvic transverse. The mechanism differs from the two preceding positions, in the head executing only the motions of flexion, descent, increased flexion and

extension. The motion of rotation is unnecessary, and the direction of restitution will depend upon which shoulder engages at the pubic arch. If nature does not reduce this to an occipito-posterior position, and the labor is slow and painful, it may be facilitated by effecting the reduction artificially, in the same manner, and guided by the same rules, as named, when treating of the mechanism of occipito-pubal positions. The head may present in positions not exactly agreeing with those just given, relative to which, Dr. Dewees very correctly remarks: "Mathematical precision is not required in such cases, especially as the mechanism of the labor is not altered; for when the posterior fontanelle is at all in advance of the sacro-iliac junction, either right or left, it will almost always eventually place itself under the arch of the pubes, and this is all that is necessary."

It may be proper to remark here that sometimes the movements of the head do not occur exactly in the manner just described. Flexion, for instance, will be found to occur previous to the descent of the head, or simultaneously with it, or not until the head has reached the pelvic floor; and, occasionally, extension will take place so far as to gradually place the anterior fontanelle in the center of the pelvic cavity, flexion occurring, however, as soon as the descent is completed; this last irregularity is more usual with the occipito-posterior positions. Again, Dubois has met with a few cases, in which excessive flexion brought the posterior fontanelle to the center of the excavation (or perhaps, an inclination of the trunk backward, may have effected it), but which was restored to its proper situation upon meeting with the resistance from the pelvic floor.

Rotation may also vary; it may commence while the head is at the upper part of the pelvic cavity, so that flexion, descent, and rotation occur simultaneously; or it may not take place until the head has almost passed the posterior commissure of the vulva. Rotation may also be incomplete, or it may be so extensive as to carry the occiput, not only to the pubic symphysis, but even beyond it, to the acetabulum of the opposite side; in these latter instances, after a short period of rest, it again places itself behind the symphysis, by a retrograde motion. These irregularities are not easily accounted for, and though they may render the delivery tedious, yet it will generally be effected without any artificial interference.

Rotation of the shoulders likewise, offers some irregularities; it may be wanting, or it may be incomplete, or it may be excessive, the same as with the rotation of the head.

The pressure upon the circumference of the head, produces a sero-sanguineous engorgement over the part not subjected to the compression, and which is always the lowest or presenting part. This tumor, *caput succedaneum*, may become so developed as to obscure the diagnosis, or lead to the supposition of a breech presentation; but, if the finger be carried beyond its circumference, the bony resistance of the head will determine the presentation. The diagnosis of the position, may, however, not be so readily ascertained, as this engorged condition of the scalp may prevent the detection of the fontanelles; in such cases, the delivery will require to be performed without interference, bearing in mind, that in vertex presentations, the major part are delivered by the unaided efforts of nature.

This tumor of the scalp is an unerring indicator of the position of the fetal head; thus, in the left occipito-anterior position, it will be found on the right parietal protuberance, and in the right occipito-anterior on the left; in the occipito-posterior positions, it is located about the center of the vertex, sometimes on the anterior fontanelle, but, generally, to correspond with the part originally at the os uteri, and subsequently with the part which presents under the pubic arch.

It may be distinguished from a sanguineous tumor of the head, which Nægèle has termed *cephalæmatoma*, by the following characteristics: it is irregularly circumscribed, being larger in proportion to the tediousness of the labor; is always single; is œdematous, retaining the pit of the finger; has no fluctuation; and the scalp is of a well-marked violet color. The cephalæmatoma vary in size, from a small nut to a hen's egg; it is distinctly circumscribed; possesses a well-marked fluctuation, sometimes pulsations; its center is sometimes so greatly depressed as to be mistaken for a perforation of the bone; its base is limited by a prominent osseous border, which, however, is often not developed for several days after the commencement of the disease; and the skin covering it is colorless. Again, the *caput succedaneum* appears directly after birth, and disappears in from twelve to forty-eight hours, while the *cephalæmatoma* seldom appears until some hours after the delivery, and lasts for several weeks.—*Cazeaux.*

CHAPTER XXIX.

ON DIFFICULT LABOR—FIRST STAGE.

DIFFICULT, lingering, tedious, and protracted labor, belongs to the second class, and includes all labors where the fetal head presents, but where they continue beyond twenty-four hours, and may require some medicinal, manual, or instrumental aid. It is true, that cases will be met with, in which artificial delivery may be required within the twenty-four hours, and others, again, which may continue for a period considerably beyond twenty-four hours, but these instances form exceptions to the above definition. As a general rule, however, the one given will be found exceedingly salutary and beneficial in practice, and an attention to which, will be calculated to prevent the occurrence of any mischief from a rash or premature interference of the practitioner. This class of labor has also been termed *unnatural*, but as I can see no especial reason for changing the terms usually applied to it, and which in my opinion much better express the character of the labor, I still adhere to the designation "difficult," which comprises every description of labor in which the process fails to be accomplished in a prompt and regular manner.

The danger in a difficult labor depends entirely upon the stage in which the delay happens; thus, the first stage of labor may continue for even sixty or seventy hours, with but little, if any danger, especially if the membranes remain entire, and there is a proper amount of liquor amnii present, and no mechanical impediment exists. But delay in the second stage, is always attended with danger, if it continues beyond a comparatively short time; hence, in estimating the necessity for interference, we are not to be governed so much by the length of time occupied by the first stage, as by the interval which has elapsed since the rupture of the membranes and the discharge of the amniotic fluid; and the experience of accoucheurs has demonstrated that the danger is, commonly, in proportion to the duration of the labor. From statistics of the Dublin Lying-in-Hospital, it appears that when labor exceeds thirty hours, one woman in thirty-four dies; when it exceeds forty hours, one in thirteen dies; beyond fifty hours, one in eleven; and beyond sixty hours, one in eight.

Difficult labors are more common among primiparæ, and are, likewise, not unfrequent among multiparæ who have given birth to a large number of children. According to the statistics of English obstetri-

cians, 653 cases of difficult labor occurred in 23,758, or about 1 in 36 ; and it will frequently happen, that a practitioner in his individual private practice, may meet with even a much larger average than this.

The continuance of a labor beyond a period of twenty-four hours is necessarily calculated to arouse the fears of the patient and her friends, as to the cause of the delay ; and if the practitioner does not proceed properly in such instances, the anxieties and doubts of the friends may lead them to require the aid of a second accoucheur, or perhaps the dismissal of the first. It is therefore always proper, when the labor has continued thus long, to institute a careful investigation of the condition of the patient, and of all the presenting symptoms, for the purpose of learning the cause of the delay, and at once applying the remedy. “ In estimating lingering labors, we calculate from the first commencement of true uterine action ; but in estimating the length of labor, in reference to the patient’s strength and its effects on her system, we principally take into consideration the time that has elapsed since the membranes broke ; for it is reasonable to infer that no great exertion has been sustained, consequently that little or no exhaustion has appeared ; and particularly, that scarce any injurious pressure can have taken place on the soft parts within the pelvis, while the membranous cyst remained entire, provided there be an ordinary quantity of liquor amnii. Thus, when called to a case of lingering labor, in considering the chance of injury from its duration, our mind should be directed, not so much to the interval which has elapsed since the first accession of uterine pains, as to the time at which the membranes ruptured ; and that should be looked upon as the period when it was possible for dangerous pressure to have commenced.”—*Ramsbotham*.

The management of a patient in difficult labor must be similar to that required in natural labor. She should not be kept in one position, but should be allowed to sit, walk, or lie down, as she may prefer, and more especially in the early part of labor ; in the latter stage, circumstances may require her to preserve the recumbent posture. She must not bear down or make any efforts to assist the uterus during its contractions, as such efforts may cause the membranes to give way prematurely, exhaust the patient’s strength uselessly, or otherwise interfere with the progress of the delivery ; and this is a point which can not be too strongly insisted upon. It is only during the second stage of labor, when the presentation and position are both favorable, that the action of the muscles of the abdomen may be exerted with advantage. The room should be kept cool and quiet, to prevent fever and induce sleep. Bland, nourishing fluids, weak tea, or acidulated

draughts, may be allowed, but stimulants and solid food must be prohibited. Too frequent vaginal examinations are injurious, but the condition of the bladder should be ascertained every two or three hours, and much urine should not be allowed to collect in it. This is of especial importance in difficult labors: the urine must be passed often, either naturally or by catheter; and in the use of the latter, no force should be employed, and care must be taken not to permit it to slip into the bladder. If the metallic instrument can not be introduced, an elastic catheter must be substituted; and although under ordinary circumstances no exposure of the female is allowable, yet there may be instances where, from the failure in introducing the above instrument, and the condition of the parts, an exposure will be necessary to accomplish the desired evacuation of the bladder. This, however, must never be practiced, except under the most imperative requirements. This class of labor may be owing to one or more of several causes, referable to: 1, the uterus; 2, the parts or passages through which the child passes; or, 3, to the child itself, and which I shall now proceed to designate and treat upon:

1.—Among the abnormal conditions of the uterus, that may occur during the first stage of labor may be named as a very common cause of protracted labor, **INEFFICIENT ACTION OF THE UTERUS**, in which the contractions are partial, feeble, or irregular; they may continue only for a few seconds, they may hardly be appreciable, or they may occur at irregular and lengthy intervals; and in each instance, the os uteri may be soft and dilatable. This cause will, in some cases, be owing to a torpid, inactive, and sluggish condition of both mind and body, or a want of tone or proper nervous irritability in the constitution; to some depressing action, as debility resulting from excessive discharges, previous disease, etc.; to sudden and violent emotions of the mind, and other circumstances which exert an influence on the brain and nervous system. Debility of the system, or even the presence of serious disease, does not invariably occasion inertia of the uterus, for we frequently meet with females laboring under tubercular phthisis, hectic fever, etc., who pass through their labors with great facility. With some females the tendency to difficult or easy deliveries appears to be a peculiarity transmitted from parent to child, and occurs independent of any abnormal conformation, or habit of the system. A deranged condition of the digestive organs will frequently influence the character of the uterine contractions, as will likewise irritation of the os or cervix uteri. Cancer of the uterus,

fibrous tumors, uterine inflammation, rheumatism of the uterus, etc., may also interfere with the uterine contractions, rendering them deficient in dilating or expelling power, and irregular in their intervals, but these causes are more apt to prove dangerous during the second stage, and will, therefore, be more particularly noticed hereafter.

Females are often annoyed, at the close of gestation, with false, spasmodic, or irritable pains, which have no connection whatever with the contractions in the fibers of the uterus, and which have, in some instances, given rise to the absurd statements that labor has continued uninterruptedly for one, two, or more weeks. Care should be taken to distinguish these from the proper contractions of the uterus.

Inefficient action of the uterus may occur during the first or second stage; and, as before remarked, the danger is greater in the latter than in the former instance. In the *First Stage* we may find the pains feeble or irregular, and exerting but little influence upon the bag of membranes; yet if there is only a slight increase of the pulse, "with the surface of the body cool, tongue moist, absence of thirst, no tenderness of the abdomen on pressure, no heat or tenderness of the vagina and os uteri, and dilatation is advancing, however slowly, we ought not to interfere, for many hours may elapse before this stage will be completed, and yet the pressure of the fetal head upon the soft parts will produce no evil effects if the apartment be kept cool, the posture be occasionally changed, voluntary efforts at bearing down be avoided, and nothing but mild nourishment and diluents be allowed."

TREATMENT.—When there is considerable delay in the advancement of the first stage of labor, the patient should be kept in as cheerful condition as possible, and she may occupy the time by walking about—but not to cause fatigue—by reading or sewing, by frequently changing her position, etc.; and should be encouraged to exercise patience, which virtue the practitioner will find equally demanded on his part. If the bowels have not been freely evacuated, a stimulating enema or a dose of purgative medicine may be given, and which will frequently arouse the uterus to increased action. If the pulse is weak and slow, and no heat, but rather coolness of the surface, nor hemorrhage, some arrowroot, or gruel, or wine and water, may be beneficial, but their use should be permitted with caution. If, from the want of sleep, continued suffering, and anxiety of mind, the patient should become fatigued or exhausted, a soporific dose of some desirable agent should be administered, and natural sleep encouraged, indulging her in rest and sleep for one or two hours; upon awakening, she will not only feel refreshed, but will very likely have a

recurrence of the pains with increased energy. If an opiate is administered, it should always be preceded by a purgative when constipation exists. In a number of instances I have succeeded in restoring normal power and proper intermittent action to the uterus solely by the administration of Sulphate of Quinia in a five or ten grain dose.

If there is a plethoric condition of the uterus, or an irritated state of the os and cervix uteri, this may be frequently overcome by the use of the sedative, which will usually be Aconite, in addition with the specially indicated agents, as Macrotys, Lobelia, Gelsemium, or Pulsatilla, as they may be severally indicated, together, in some cases, with the compound powder of Ipecacuanha and Opium. Plethora of the uterine tissue may be known by the energy with which the pains are at first manifested, but which soon diminish in frequency and intensity. The cervix is soft and yielding, but the presenting part does not engage during the pain; the pulse is hard and full, the respiration laborious, and the pains are equally diffused over the whole abdomen.

Sometimes the employment of warm diluent drinks, with frictions over the abdomen, will frequently succeed in restoring or increasing the contractions, without other aid being required.

When the pains which occur at very irregular periods are confined to the uterus, and do not render the bag of waters tense, nor impart any hardness to the uterus when felt through the abdominal parietes, the pulse being quick and full, and the uterus unusually developed, the inertia is owing to an *Excess of Liquor Amnii*, overdisting the organ, or perhaps to the presence of *Twins*. In this case, although the soft parts are relaxed and dilated or dilatable, the labor does not progress any, the uterus being, from this cause, rendered incapable of contracting sufficiently powerful to rupture the membranes, and the patient becomes fretful and restless. The only remedy in this case, is a discharge of the liquor amnii by an artificial rupture of the membranes, which should be done during the absence of pain [the os uteri being well dilated], and made as high up as possible, in order to avoid a falling or washing down of the cord; though I would especially desire to impress it upon the mind of the student that this procedure is entirely unjustifiable in ordinary labors, and must not be attempted unless it is well ascertained that there is no mechanical impediment, that the head presents, and the os uteri is dilatable. A premature rupture of the membranes, by discharging the bag of waters and bringing the hard and unyielding head of the child upon the sensitive os uteri, may delay the labor by lessening the pains, or producing

rigidity of the os. Still-born children are more frequently the results of too early rupture of the membranes, and, probably, the use of instruments are likewise oftener required in such cases.

If the relaxation or cessation of uterine contractions depends upon moral influences, the attendant, by ascertaining the trouble, may perhaps, by a prudent and sagacious course, remove them; but if this is impossible, he will be governed by the effects produced, using stimulants in case of depression, and sedatives where much nervous excitement exists; Pulsatilla is likewise an excellent remedy, especially where there are unpleasant sensations with the nervous excitement, the patient complaining that "*there is something wrong with the child.*" The induction of sleep, also, will frequently be followed by uterine efforts.

I am decidedly opposed to the use of Ergot during the first stage of labor, where the only difficulty is the inefficiency of the uterine contractions, for, as a general rule, an attention to the various symptoms which may present themselves, during this stage, with their appropriate treatment, will be all that is demanded. But, should circumstances require the use of agents which exert a parturient influence upon the uterus, Macrotys, Aconite and Macrotys, or Pulsatilla if the patient is nervous, will prove, as a general rule, more salutary than the Ergot. Occasionally females will be met with, upon whose uterine systems these agents produce but little, if any influence, and in whom, under imperious circumstances, it may become necessary to administer Ergot, but I shall have occasion to refer to these cases hereafter, as well as to others in which Ergot may be employed. Usually, however, the remedies above noticed, both during the first and second stages of labor, will prove fully as efficacious as Ergot, without any of its injurious tendencies. As heretofore observed, I have found that Sulphate of Quinia will frequently correct the inefficient action of the uterus. Want of pain, or tardy pains, are met by Lobelia in some cases, which may be given with the Macrotys if there is a fullness and oppression of the pulse.

2.—RHEUMATISM OF THE UTERUS may be present during the non-gravid condition of the organ, at an early period of gestation, and at the time of labor during either of its stages. It is produced by the same causes that favor the development of rheumatism in other parts, as exposures to cold and moisture, insufficient clothing, sudden changes of temperature, especially from a high to a low one, and

occasionally, from a rheumatic metastasis; females constitutionally disposed to rheumatism are more liable to it, though it frequently exists without any other part of the system being affected by it.

“The most prominent symptom of this disease is pain, or a distressing sensation, without any appreciable cause, and which may involve the whole or only a portion of the uterus. The intensity of the pain is variable, and the whole organ may suffer from it, or only a part, as the fundus, corpus, or cervix. The location of the pain depends upon the portion of the organ which is affected; thus if it be seated in the fundus, the sub-umbilical region will suffer the most; if in the inferior portion of the uterus, acute dragging sensations will be experienced extending from the loins to the groins, thighs, and external genital organs. Pressure upon the organ augments the pain, and if the inferior part of the womb be affected, much suffering will be caused by pressure upon the cervix during a vaginal examination. Frequently the contractions of the abdominal muscles, or even the weight of the bedclothes, will increase the pain. The pains, as with all rheumatic affections, frequently metastasize, and pass from one point of the organ to another, or to some other organ, and not unfrequently disappear suddenly. Remissions occur sometimes, during which a sensation of weight in the part is experienced. Recto-vesical tenesmus almost always accompanies the pain, and the evacuation of urine is attended with considerable smarting and acute pain, and at other times the evacuation of both the bladder and rectum is impossible. The pain is usually attended with febrile symptoms, but sometimes these are absent. A repetition of the attacks of pain is very apt to occasion uterine contractions, which may determine an abortion.

“When rheumatism of the uterus occurs during labor, it generally impedes the progress of the labor, and sometimes, even prevents the spontaneous expulsion of the child. Normal contractions of the uterus only begin to be painful, when it has accomplished the greater part of its task, and is in the act of distending and dilating the os uteri; or in other words, true labor-pains begin only at the instant when the energy of the corpus uteri overcomes the resistance of the cervix. While in rheumatism of the uterus, the contraction is painful from the first, and before any influence is exerted on the cervix; so that the cause of the pain is not in the violent distension of the os uteri, but in the contraction itself, in the other morbid conditions and in the altered relations of the nerves and contractile fibers of the uterus.

“Again, in a natural labor, the contractions commence at the

fundus, and are directed toward, and terminate at the cervix. In rheumatism, instead of commencing at the fundus, they begin at the painful part, and run toward the cervix in an irregular manner. The rheumatic pains also exist before the uterine contractions, and under the influence of the latter, they rapidly acquire a high degree of intensity; and sometimes their violence arrests the contractions before they have traversed their ordinary cycle, in which case they are rapid, short, and grow less and less frequent.

“Toward the close of the labor, when the action of the uterus requires to be aided by the voluntary contraction of the abdominal muscles, the female, for fear of augmenting her sufferings refrains from contracting these muscles, thereby causing the labor to be excessively slow. She is in a state of extreme anxiety, with an increase of the frequent pulse, the hot skin, the thirst, and urinary tenesmus. When these sufferings are much prolonged, she falls into a state of swooning, which frequently proves serviceable, as the pains are suspended while it lasts; under these circumstances a profuse perspiration has been observed, which has had a most salutary influence on the rest of the labor. But, in other instances, the uterus becomes more and more painful; it is rather in a state of permanent contraction or fibrillar vibration, than of normal contraction; the pulse being accelerated, and the woman threatened with a metritis, which renders the labor extremely painful.”—*Cazeaux*.

Uterine rheumatism is frequently mistaken for acute inflammation of the womb, and as the symptoms resemble each other very much, it is very difficult to discriminate between them. Rheumatism attacks mostly very nervous and susceptible women, and may be more readily suspected when the patient has had previous attacks of rheumatism or neuralgia, in other parts. Cazeaux determined the disease by touching; thus, rheumatism and inflammation of the uterus are both painful; but in rheumatism, although the first touch of the womb is painful and quick, yet upon gently and slowly raising it upward with the index and middle finger, the pain either ceases altogether, or is much mitigated, by removing the tenesmus uteri; while in inflammation the touch becomes more painful the more it is prolonged.

TREATMENT.—The means which may be adopted with benefit in these cases are various. In the first place the bowels, if they have not been previously evacuated, must be emptied by an injection; if the pain be not very severe, but troublesome and annoying, the compound powder of Ipecacuanha and Opium may be given, in doses of three to five grains, and repeated every half-hour or hour; other

agents, however, will usually be called for, and among the first *Macrotys* should be thought of, and in many cases will be all that is needed. If the pain is attended by an excited circulation, *Aconite* should be added, always observing the usual small dose. If the pain is inclined to extend down the thighs, and to the region of the back, *Pulsatilla* may be given with the *Macrotys*. If there are marked remissions, *Quinine* may be given in doses of three to six grains, and repeated as often as seems necessary. Fomentations of *Stramonium* leaves, or other narcotics, may also be advantageously applied over the abdomen, and, when the pain is very severe, much benefit will be derived from the application of dry cups over the lateral inferior portions of the sacrum. Should the disease manifest itself soon after the sudden disappearance of a rheumatic pain in some other part, revulsives or counter-irritants should be placed over the part primarily affected, for the purpose of recalling the pain, if possible, to that part.

Other means may likewise be used in some cases, in addition to those just named; *Lobelia* may be indicated by the unpleasant sense of weight and dragging in the abdomen and pelvis, or if the pains are associated with a sense of muscular debility *Nux Vomica* will be the remedy.

The disposition to uterine rheumatism at the period of labor may, in most instances, be entirely overcome by the use of the *Parturient Balm* during gestation. General venesection, although it may afford relief, is never necessary, as its results are ultimately more disastrous to the patient than beneficial, and a more permanent advantage is gained over the disease by the above course, than could possibly be effected by the employment of the lancet; and by pursuing it, there will exist but little necessity for forceps, unless other symptoms, not immediately connected with the rheumatic attack, are present.

3.—RIGIDITY OF THE OS UTERI, during the first stage of labor, is a frequent cause of its protractedness. This may occur in any case, but is more frequently met with in primiparæ, in females of an advanced age, and in instances where the membranes are prematurely ruptured. It may be occasioned by repeated and unnecessary examinations, the use of stimulants, mental excitement, constipation, or retained urine. It may also be owing to dysmenorrhea, or a diseased condition of the os itself, either natural, or effected by the improper use of pessaries or other mechanical aids to support the

uterus, as well as the imprudent application of escharotics to the os, for the removal of some real or imaginary affection.

Rigidity of the os uteri may be suspected in cases where the head presents and the pains are regular and normal, but dilatation proceeds very slowly, if at all; the pains gradually lose their force, and the patient becomes exhausted; in addition to which, Madam La Chapelle refers to another symptom, viz.: pains in the loins. On examination, the os uteri will be found thin, resisting, hot, dry, and painful to the touch, or, soft, œdematous, semi-pulpy, and undilatable, and which must be carefully distinguished from the soft and flabby condition into which the thin and rigid cervix must pass before it will dilate. Sometimes the rigidity is excessive, the os being unusually dense, feeling like cartilage, with a stubbornly unyielding edge; or if this be thin, the same resistance will be met with, and a sensation is conveyed to the touch, similar to that produced by a hole made in thin, extended parchment.

Very frequently the rigidity will not be confined to the os uteri, but will extend into the vagina and soft parts; they will be found hot, dry, swollen, and extremely sensitive to the touch, and if this condition be not overcome, the patient becomes restless and feverish, the pulse rises to 100 or 110, and finally, exhaustion of the vital forces manifests itself. Occasionally the os uteri will be found to contract during a pain, remaining rigid in the interval; and in such instances a rupture of the uterus may occur. Instances are recorded in which the rigidity was so obstinate that the os uteri has been torn off and expelled in the form of a ring.

TREATMENT.—Formerly venesection, *ad deliquum animi*, was considered the most successful and potent remedy in this difficulty, and was the one on which the utmost reliance was placed by the major part of the profession. I admit that bleeding will, in most cases, have the effect of overcoming rigidity of the os uteri, but I by no means admit it to be a proper or safe remedy. A female in labor requires all the strength natural to her system, not only to sustain her during its progress, but also to enable her to withstand and quickly recover from the nervous shock. By the loss of an amount of blood sufficient to cause syncope, a debility of the nervous and circulatory systems must ensue, producing a condition unfavorable to either of these requirements; and a tedious second stage, with subsequent hemorrhage or other evils, frequently followed a bleeding practiced in the first stage, and which, no doubt, were augmented, if not actually produced, by the venesection. Debility of the

system, and more especially when sudden, persistent, and at the period of parturition, is incompatible with a safe or energetic labor. Beside the weakening influence of venesection upon the constitution, we have an increased prostration of nervous and muscular force, produced by the shock imparted to the brain and nervous system, as well as by the loss of blood which necessarily follows the birth of every child. Indeed, it is impossible for any practitioner to determine what amount of blood may be lost from the labor itself, independent of any artificial discharge; and who can tell how many precious lives have been lost from uterine hemorrhage, or other fatal symptoms, in the practice of believers in this treatment, which might have been preserved had the lancet been cast aside? Indeed, so well were the adherents of this practice satisfied of its danger to the parturient woman, that they especially advised not to resort to it until the parts become swollen and tender, the pulse increased, with febrile symptoms, or a tendency to cerebral congestion; and even then to use it with great care. The injurious tendencies of bleeding do not cease with the completion of delivery, for, whether it be artificially effected by the lancet, or naturally by uterine hemorrhage, not only is the puerperal month one of slow, tedious convalescence, if this term can justly be applied to it, but very frequently a life-time of irremediable suffering and disease is the inevitable consequence. Tartar Emetic was also a favorite remedy of the champions of venesection, and was administered in nearly every case of rigidity of the os.

In the treatment of this difficulty, we have no occasion to wait for the appearance of the above symptoms before attempting relief, because we have means to subdue it without the infliction of any immediate or permanent injury to the system, and as soon as the evil manifests itself, we at once apply the remedy, saving the patient a great amount of suffering, and the friends and ourselves much anxiety and alarm. And hence, we believe our practice has a vast advantage over that which dare not attempt *certain* relief until after a lengthened period of pain and distress, and when exhaustion of the vital forces is about to commence. Promptness in combating this condition, as well as many others, is the only method by which to insure certainty of success.

In cases of rigidity, during the early part of labor, it will be necessary to pay particular attention to the evacuation of the contents of the rectum as well as of the bladder; if, after having waited for ten or fifteen minutes subsequently, the rigidity still remained, the old time treatment of eclectics was to administer at once the compound

tincture of Lobelia and Capsicum, in doses of one, two, or four fluid drachms, according to the urgency of the case, to be repeated in ten or fifteen minutes should it be required; and, in the generality of cases, this would effect a speedy and safe relaxation. In some cases, in conjunction with the above, an injection of the same tincture was employed, in the quantity of half a fluid drachm, or a fluid drachm diluted with a similar amount of water, requesting the patient to retain it as long as possible. In many instances this enema, it is claimed, was sufficient to overcome the rigidity, without the administration of any medicine by mouth. This compound is not at present used, to any great extent; it was, no doubt, a good antispasmodic, and was an efficient means in overcoming the condition for which it was prescribed, and was only discarded on account of its disagreeable taste and the large dose required. Lobelia, or Gelsemium, are the specific agents now recommended for this difficulty. The emetic influence of Lobelia is not necessary, to produce the required result, nor, indeed, is it always desirable that emesis should follow; much more salutary and immediate results will ensue from nauseating and relaxing doses—and when vomiting has once occurred from its use, without relaxation, it will frequently be found that smaller doses will not be retained sufficiently long upon the stomach to exert any relaxing influence. Lobelia is the remedy commonly indicated; its effect is direct and certain, especially where the parts are full and doughy; it not only overcomes the rigidity, producing dilatation, but at the same time favors uterine contractions. It is, indeed, one of the most valuable remedies in obstetrics. Gelsemium is likewise an efficient remedy, and may be used in many cases with benefit. It possesses an advantage over Lobelia, in not causing nausea or vomiting; but, as a general rule, its influence is not so readily experienced as with that agent. Gelsemium should be selected when the tissues are thin and tense, want of secretion, the contractions are painful, the patient nervous, the vagina hot and dry.

In those cases where inflammation of the os uteri is caused by unequal pressure of the child's head upon it, the Gelsemium will be found a valuable remedy.

The induction of copious perspiration, by the spirit vapor-bath or otherwise, has been advised, and will, probably, be found effectual in some cases; but, on account of the trouble attending its application during parturition, and the danger of chill subsequently, it is better to employ it only when imperatively required.

The direct application of extract of Belladonna to the os uteri, artificial dilatation, etc., have been recommended by various writers, but I have never used them; the above means having proved successful in my own practice, as well as in that of others presented to my notice.*

* In relation to manual dilatation of the os uteri, which has been recommended by some writers, under certain circumstances, it may be well for the student to acquaint himself with the following rules, given by Prof. Dewees, which may prove serviceable in the cases to which he alludes:

"1st. When this part does not coincide with the direction of the uterine forces, and the axis of the vagina. In this case, labor may become very tedious, for the want of a correspondence of the axes; I therefore attempt to establish them, as directed in cases of obliquity of the uterus.

"But I never attempt even the slight change here spoken of, until the os uteri is yielding, and at the same time dilated, to the size of a dollar, and the pains in pretty full force. By this method, not the slightest violence is committed, nor is even pain excited.

"2d. When the pains are powerfully protrusive, and the os uteri, though pretty amply dilated, yet not sufficiently so to permit the parietal protuberances to pass freely through it. In this case, much time and suffering are very often saved, by running the extremity of the finger round the margin of the os uteri, and gently stretching it. For, in many instances, if we gain an increase of half an inch in the diameter of this part, it is all that is required, to enable the head to pass it.

"3d. When the head is detained by the anterior portion of the uterus being in advance of it, and holding it as it were, in a sling. In this case, that portion of the neck of the uterus, which is placed before the head, is obliged to sustain the whole force of the uterine efforts; in consequence of which, it becomes not only severely stretched, but it very effectually opposes the advancement of the presenting part, and gives rise to much unnecessary delay, as well as very much augmenting the sufferings of the patient.

"This case is one of very frequent occurrence; and women who have ample pelves, and especially those who have had several children, and are liable to the anterior obliquity of the uterus, are more particularly obnoxious to it. I do not know that any writer has noticed this cause of tedious labor; and though this can not, strictly speaking, be considered as an instance of rigidity, it nevertheless has all the effects of that condition, as it creates delay, by a portion of one of the soft parts opposing the passage of the head; and may, therefore, with much propriety, be considered under the present head of our subject.

"We are every way satisfied, from long observation, that this situation of the uterus, and of the head of the child, is one of the most common causes of delay when everything else is favorably disposed, that occurs in practice—at least in this country. Whether this be so in Europe, where the remote causes, namely, large pelvis, are not so general, we are unprepared to say; but we are certain, that the frequency of this relation of the head of the child, and the anterior portion of the uterus, in this country, render such labors more tedious, by hours, than they would be, if no such interposition of the neck of the uterus took place.

"It is true, that the remora which the neck of the uterus offers to the passage of the head when down before it, never of itself creates a serious difficulty; the evil chiefly consists in a painful and unnecessary delay; but as the case is always manageable,

Rigidity depending on disease of the os uteri may be removed by the above plan, but it can not always be expected to answer. Incising the cervix has been advised as a successful measure in those cases which prove very obstinate and protracted; but I have never had occasion to attempt the operation. The inhalation of Chloro-

when it is proper to offer aid, it is certainly right to correct this deviation from a strictly healthy labor, as early as circumstances will permit.

"The proper time to act is, when the head occupies the inferior strait and vagina, completely; when the pains are active; and when the os uteri is sufficiently dilated to permit the head to pass, if the axis of the head, and that of the os uteri were coincident.

"To relieve the head from this state of embarrassment, we must draw the prolapsed edge of the os uteri by the point of the finger, in the absence of pain, toward the symphysis pubis, and maintain it there, until a pain comes on. At this moment, the point of the finger is to be placed against the edge of the uterus, which is to be pushed upward between the head of the child and the pubes. Should we be able to carry the prolapsed portion of the uterus above the advancing portion of the head, the former will suddenly withdraw itself from the finger; the vertex will apply itself to the arch of the pubes, and the labor terminate almost immediately.

"It sometimes, however, requires several trials of this kind before they may succeed; but the attempt must not be abandoned because it fails a few times, for the principle is a correct one, and should be acted upon perseveringly, should perseverance be necessary. We have everything to gain, if we succeed, and nothing to lose if it fail; a disappointment, by-the-by, which can not well happen, if the process for the restoration of the prolapsed part be properly conducted.

"We are convinced that we have seen very many labors, shortened by hours, by acting as just proposed for such cases. It would be extremely difficult to determine, *a priori*, the duration of a labor of this kind, if left to itself; as the resistance which the margin of the uterus offers to the head, will for a long time be more than equal to the power of the uterine forces; consequently, the labor becomes stationary, and will continue to be so, until the margin of the uterus is obliged to yield, by its losing a part of its power from attenuation, or perhaps by tearing.

"Nobody estimates the general rule, 'to let a labor alone that is advancing well, and is natural in its general relations,' more highly than we do; we look upon it as a most wholesome restraint when acted upon; and is every way calculated to diminish ignorant and mischievous officiousness. But this rule, like every other general rule, has its exceptions; and we may be even accused of violating it unnecessarily, when we make the cases under consideration exceptions; but we should feel but little concern upon this head, if the charge be even preferred against us, as we are certain that we are justified in making them from ample experience.

"Many, nay, perhaps everybody (for we have said that we did not know that this case had been noticed), will condemn what we have said upon this subject, and consider our directions as unnecessary, if not mischievous, because they have never had recourse to them, but have permitted the uterus to perform this duty unaided; therefore they say nature is competent to the work, and when she is competent, she is not to be interfered with. Were this rule rigidly acted up to, there would be an end to improvement, not only in the obstetric art, but in the whole range of practical medicine. Our experience, however, teaches us not to heed this sweeping, indiscriminate rule; for it is not sound practice to permit nature to struggle through difficulties,

form is a very efficacious remedy in overcoming rigidity of the parts, and is used by many in preference to other means.

When the various means recommended to subdue the rigidity fail to accomplish this result, and artificial delivery becomes necessary, it is recommended to complete the labor with the forceps, provided the os is fully dilated, and the fetal head has descended so low into the pelvic cavity that an ear can be felt. But if the os is not fully dilated, and the greater part of the fetal head remains above the superior strait, and circumstances present, demanding prompt delivery in order to save the mother's life, the perforator and crotchet *must* be employed, for in such instances, the attempt to deliver by forceps would be rash and unjustifiable; however, it will seldom happen, unless in cases of diseased os, that the treatment above named will fail in overcoming the rigidity.

The tendency to this cause of difficult labor, as well as of inefficient uterine contractions, may generally be obviated by a proper course of management through the gestating period, or at least during its latter months, in all cases where the physician is aware of his selection as the accoucheur. For a few months previous to the expected labor, he should explain and impress upon his patient's mind, the necessity and advantages to be derived from a proper preparatory course, especially, if any circumstances exist, which might lead him to anticipate a difficult parturition. The course to be pursued at this time, and which has proved generally successful, is, to keep the bowels in a normal condition by diet, if possible, otherwise, by mild laxatives; avoid fatigue, overstimulus, and improper food, and administer once or twice daily, a dose of the Parturient Balm, which exerts a healthy tonic influence over the uterus, disposing it to act with proper energy at the time of labor.

merely because it is supposed she can struggle through them; and to leave it for some time a moot point, whether or not the case will eventuate in safety, when aid, as certain, as safe, is always at command. Nor does this application of the finger ever produce pain or other inconvenience, if properly and gently managed.

"Beside much delay is sometimes experienced from this dropping down of the anterior portion of the uterus, by interrupting the pivot-like motion of the head, from completing itself; especially when the head occupies pretty strictly the inferior strait. In this case, the posterior fontanelle will remain for a long time stationary behind one of the foramina ovalia; for its advancement toward the arch of the pubes, is prevented by the prolapsed portion of the uterus interfering with the motion just mentioned, by embracing too strictly the advancing part of the head.

"But the pivot-like motion of the head is almost always restored, the instant we succeed in passing the depending portion of the uterus above the head of the child by the point of the finger, as directed above."

4.—The proper position of the uterus is when it occupies the middle of the abdomen, with its longitudinal diameter in the direction of the axis of the superior strait; but in persons of a lax and flaccid habit of body, and especially with those in whom the walls of the abdomen have become relaxed, it frequently inclines anteriorly or laterally, which inclination is termed **OBLIQUITY OF THE UTERUS**, and which may, by producing rigidity, or other symptoms, retard labor; the positions of the presentations are frequently affected by these obliquities, and the deviations of which, continue, in many instances, even after the uterus has been restored to its normal situation. There are three varieties of obliquity: an anterior obliquity, in which, from excessive relaxation of the abdominal parietes, the fundus uteri falls forward, throwing the os uteri upward and backward in an unusual degree; a right lateral obliquity, in which the fundus falls toward the right side; and a left lateral obliquity, in which it falls to the left side. Among these the left lateral obliquity is more frequently met with. In an anterior obliquity, the female will be very apt to imagine herself larger than usual, or perhaps, that she will give birth to twins. These obliquities may be ascertained by observing that the fundus of the uterus falls to the right, or left, or anteriorly, and that the os uteri, instead of its normal situation in the center of the pelvic cavity, is directed laterally to the right, or left; and in the anterior obliquity it will be found upward and backward, elevated to an extent corresponding, relatively, with the anterior inclination of the fundus. These obliquities, when excessive, especially the anterior, have frequently given rise to the idea that the os uteri was imperforate; and if not readily recognized and overcome, they may occasion more or less serious accidents to both mother and child.

TREATMENT.—This difficulty can be removed, by placing the patient upon the side opposed to the obliquity, or upon her back in the anterior variety; and when the replacement of the uterus is accomplished, by applying a bandage firmly around the body, the organ may be kept in its normal position. In the early stage of labor, it will be found advantageous, in these cases, to keep the patient upon her back, having the shoulders somewhat depressed, and the hips slightly elevated. Any attempt to remove these obliquities by pulling upon the os uteri is highly improper.

Sometimes there is an *Obliquity of the Os Uteri* only, and this is more apt to procrastinate the labor, than when the whole organ is inclined. Upon an examination, the os uteri will be found facing the sacrum, and oftentimes being difficult to reach. Should this condition remain for any length of time, without change, the expulsive efforts

of the uterus being necessarily directed against the anterior part of the cervix, which occupies the open space in the pelvis, may, by forcing the head downward, occasion a rupture at this point.

In a case of this kind the female should be kept in bed as much as possible, and as soon as it can be reached, the anterior lip of the os should be hooked by a finger, brought carefully to the center of the cavity and sustained there until one or more subsequent contractions, by pressing the head downward and into the opening, will thus prevent the lip from resuming its previous abnormal position.

Labor is occasionally protracted in consequence of the *Anterior Lip of the Os Uteri being retained between the head and pubic symphysis*, either being caught thus during the dilatation, or occasioned by an unequal dilatation of the anterior and posterior portions of the cervix. This may delay the first stage of labor for several hours. It may be overcome by the following operation, provided the head does not fill the pelvis too tightly, and the lip of the os uteri is not œdematous from the pressure, or inflamed, in which case, it is better to trust to the natural efforts. The operation is, to gently push the anterior lip over the crown of the head, during the absence of a pain, and retain it there by firm and constant pressure, during one or two subsequent pains, until it retracts and slips over the head. Not unfrequently, this operation will prove unsuccessful, and the continued pressure of the finger upon the lip and soft parts, will cause increased swelling and inflammation; in the majority of cases of this kind, if the constriction of the lip be relieved by pressing the fetal head more toward the pelvic cavity, or toward the sacrum, and holding it thus during a few pains, the lip will retract without any further aid. If the projecting anterior lip be hypertrophied, these manipulations will prove of no utility.

Occasionally, at the commencement of labor, and especially in cases where the fetal head is very small, or the pelvis uncommonly large, *the os uteri may descend with the head*, as far as, or even through, the pelvic outlet; this must be remedied by placing the patient upon her back, with the shoulders depressed, and the hips elevated—then by gentle and steady pressure with the expanded fingers, return the prolapsed organ to its proper location.

During the first stage of labor, the principal abnormal condition of the parts through which the child has to pass, aside from actual disease of these parts, is RIGIDITY OF THE VAGINA and soft parts in which it may become necessary to employ vaginal injections, or to apply fomentations to the perineum. A warm infusion of equal parts of Elm bark

and Lobelia may be used in injection; and the same articles may be used as a cataplasm or fomentation of the parts. These, however, will not always be required, as the means recommended for rigidity of the os uteri will generally likewise overcome the rigidity to the soft parts. When the vagina is dry, harsh, and hot, Gelsemium is the indicated remedy; or warm Lard Oil, or Lard itself, warmed into a state of fluidity, may be injected into it with much advantage; but the parts should never be anointed by friction.

Among the causes referable to the child or its envelopes, certain conditions of the membranes may be named. As a common rule, when the os uteri becomes fully dilated, the membranes are ruptured by the internal pressure upon them; but there will frequently be found exceptions to this rule. These exceptions are owing to: 1.—A RIGIDITY OR TOUGHNESS OF THE MEMBRANES, and which render the labor protracted, by retaining the liquor amnii, and thus hindering the uterus from acting with energy, after the os has become fully dilated.

TREATMENT.—In cases of this kind, the membranes should be ruptured artificially, after which the contractions will become stronger and more regular. But a proper degree of caution is required before attempting this operation, because, if prematurely effected, it may terminate in more serious results than had no interference taken place. In the first place, there should be good ground for attributing the delay to this cause; secondly, before attempting it, the os uteri should be fully dilated and the soft parts in a yielding condition; and thirdly, with primiparæ, it should always, if possible, be postponed until the first stage of labor is wholly completed. Feeble and inefficient contractions for several hours, with softness and dilatibility of the parts, and the labor having nearly or fully terminated its first stage, are among the symptoms indicating an artificial rupture. It is sometimes difficult to effect a rupture of the membranes, especially when the pains are feeble, and the use of a probe or sharpened quill has been recommended; but we must be careful in using any cutting or puncturing instrument not to injure the soft parts of the mother, nor the presenting parts of the child. I have always succeeded with the finger nail, pressing it upon the membranes during the pain, and making a sawing motion with it from before backward, or from side to side, and continuing it until the liquor amnii escapes.

2.—The wedge-like pressure of the bag of waters is an important mechanical agent in the relaxation and dilatation of the cervix and os; but when the MEMBRANES HAVE RUPTURED PREMA-

TURELY, either spontaneously or artificially, this bag is absent, the fetal head then presses upon the os uteri, but is illy adapted to aid its dilatation, and the result is a tedious and painful labor. The premature rupture may be owing to a weakness of the membranes, to violence, or to a careless examination, and which last is perhaps a more frequent occurrence than is generally imagined. An early rupture of the membranes is also an indication of a preternatural presentation, and whenever it occurs the character of the presentation should be determined as soon as possible, that timely measures may be adopted, if required. When the membranes are prematurely ruptured, the liquor amnii may be discharged in a very short time, or if the rent be small, or the fetal head lies over its orifice, this fluid may slowly dribble away, and add much to the discomfort of the patient.

TREATMENT.—If the os uteri is dilatable, and the pains are active, nothing is required but a little patience, as the labor will usually proceed with safety to both mother and child. If, however, the os uteri be rigid and unyielding, this condition must be overcome by the means already mentioned. If the liquor amnii passes off slowly, the os being dilatable, and the pains feeble, the orifice in the membranes should be enlarged, and the fetal head elevated, between the pains, toward the sacrum, in order to admit of a free discharge of the liquor, and which will be followed by active contractions. The dilatability of the os may be increased by Lobelia or Gelsemium administered internally, or by a rectal enema of the compound tincture of Lobelia and Capsicum.

In closing this chapter on the causes which may protract the first stage of labor, I desire to impress upon the mind of the student that the mere fact of the tediousness of this stage does not justify any attempts to hasten the labor. Delay in this stage seldom causes any serious accident to either the mother or child, unless, from a want of patience and prudence, it be unnecessarily or improperly interfered with. True, the female may become worn out or exhausted, but this is soon removed by an energetic uterine action in the second stage, and in which stage only is the shock given to the nervous system which may produce unpleasant or serious results. He should, therefore, be very cautious and particular in ascertaining that artificial assistance is positively required, before attempting to render it; always bearing in mind the wholesome and oft-repeated saying of Blundell, that "*a meddlesome midwifery is bad.*" No interference of any kind must be undertaken, unless it be desired to produce certain results or conditions favorable to a safe labor, and which results or conditions we know are absolutely indicated, or required.

CHAPTER XXX.

DIFFICULT LABOR—SECOND STAGE.

THE SECOND STAGE OF LABOR may be protracted, even when the first has progressed favorably, and may be owing to causes not necessarily nor immediately connected with the first stage, or which, although present in that stage, can not be determined until the complete dilatation of the os uteri, and which causes, I shall consequently consider under this head.

As before remarked, although labor may be delayed for a long time during its first stage, without any hazard to the mother or child, yet such is not the case in the second stage, for any procrastination beyond a certain period is fraught with serious consequences to both, hence, the accoucheur should allow no more delay in the labor than is absolutely necessary, but should promptly and skilfully employ all measures for facilitating this stage of the labor, that are compatible with the health and safety of the woman; to allow her to suffer unnecessarily from a tedious, lingering labor, is to say the least of it, a very censurable course. The development of bad symptoms may not take place for some hours after the commencement of the second stage, or they may occur within six or eight hours; and, as a general rule, if this stage of labor has continued for twelve or fifteen hours, symptoms of constitutional suffering will manifest themselves. The pains, after having continued regular and forcible for a time, gradually become more and more feeble, occurring at less regular intervals, and causing little or no advance of the head. They may return only at long intervals, or the intervals may be alternately short and long, or they may be regular, the pains gradually diminishing in force, until they are scarcely felt. Or, the pains may commence each time of their occurrence, with energy, but subside, almost suddenly, before they have reached their maximum development; or they may cease entirely.

This impaired condition of uterine action, is very frequently accompanied with several unpleasant symptoms, varying in degree: as severe shiverings, frequently resembling light convulsive attacks; distressing and frequent vomitings, of green, or bilious matter; restlessness and uneasiness of the patient; the skin may be dry or moist, but in either case it is hot; increase of pulse, ranging from 100 to 140; the tongue dry and furred, with sordes about the teeth; the mind despondent, disturbed, and fearful; the vagina hot, and with the os uteri, tender

to the touch ; the mucous discharge from the vagina becomes brown or yellowish, and occasionally fetid or acrid ; and urination is rendered difficult, or altogether prevented by the pressure of the fetal head. These symptoms usually occur in the order just given, and in all cases of prolonged second stage, some of them will be present. If relief be not afforded, they increase in severity ; the vomiting occurs more frequently, with ejection of dark-colored matters ; restlessness increases, with obstinate hiccough ; the abdomen becomes tender ; the skin covered with a cold, clammy sweat ; the pulse rapid and feeble ; the tongue dry and brown ; stupor and low-muttering delirium ensues, and death terminates the scene. Not only is the life of the mother endangered in such cases, but also that of the child, by the delay of proper interference.

The causes of difficult labor in its second stage may be referred to : 1, the uterus ; 2, to the parts or passages through which the child passes ; 3, to abnormal conditions of neighboring organs ; 4, to the child.

1.—Among those attributable to the conditions of the uterus, one of the most common causes of delay in the second stage, is a **CESSATION, OR INEFFICIENCY OF THE UTERINE CONTRACTIONS**. As may have been observed in the previous chapter, this is also a cause of prolonged first stage, but its effects are by no means so grave in that stage. It may be owing to disease, sudden and violent emotions of the mind, tumors, constitutional debility, etc. Females of an irritable, nervous temperament, may have labor protracted, during its second stage, from this cause ; and those of debilitated constitution, frequently have a failure of uterine action in this stage, and especially, when from prolongation of the first stage, great exhaustion occurs.

TREATMENT.—When attending a case in which the action of the uterus becomes lessened, the pains short and inefficient, or at long intervals, with no advance of the fetal head ; increased and irregular pulse, restlessness, anxiety, and wakefulness being also present, it will become necessary for the practitioner to institute a very minute and careful examination not only of the genital organs, but likewise of the condition of the tongue, pulse, skin, head, and abdomen. By the examination of the genital organs he will ascertain, if possible, the cause of the delay, and determine by it the best method of affording assistance ; and by the condition of these parts, in connection with the general condition of the system, he will be guided as to the proper time for interference.

The *cause of the delay* can, of course, be learned only from the examination. The *best method of affording assistance*, is, invariably, that which readily and most easily terminates the labor, and with the least danger to the mother and child, and which must vary according to the causes and conditions present. Among these means may be named, Ergot, Sulphate of Quinia, Macrotys, etc., the Vectis, the Forceps, and the Crotchet; each of which will be considered hereafter. The *proper time for interference*, will depend entirely upon the symptoms; an increase of the pulse, febrile symptoms, soreness and tension of the abdomen; exhaustion; watchfulness, and anxiety; a dry, hot, puffy, or swollen condition of the soft parts, caused by the long-continued pressure and interrupted circulation, and accompanied with a degree of tenderness which renders a vaginal examination painful; a retention of urine, from pressure of the fetal head on the urethra and neck of the bladder, requiring the use of the catheter, which can be introduced only with difficulty; and a change in the character of the vaginal discharges, they becoming offensive—are all symptoms requiring immediate delivery. Indeed, as a general rule, it is good practice to interfere, even before the local symptoms have appeared.

If, in cases of protracted labor from rigidity, the constitutional disturbance is excessive, with exhaustion of the vital forces, and determination of blood to particular organs, especially the brain, the *prognosis* is very unfavorable. Fever, in either stage of labor, manifested by chills, increased pulse, furred tongue, and flushed countenance, indicates the want of artificial aid; and the case assumes a still more serious aspect, if the pains gradually lessen in frequency and power, the fetal head ceasing to advance, and the female becoming exhausted. Sometimes, these symptoms come on very suddenly, requiring an immediate interference; the pains cease, the mind becomes confused and wandering, a clammy perspiration covers the face and body, restlessness with constant hiccough occurs, and the patient becomes so completely changed in features and in tone of voice, as to be hardly recognized by her friends. These symptoms may occur during the first stage, but they will be more frequently met with in the second stage, where the head has passed through the os uteri into the pelvic cavity, and has been pressing for a considerable time upon the parts at the inferior strait.

It is frequently the case that the contractile power of the uterus is so readily exhausted, that after having effected the first stage of labor, the pains cease, or become very feeble in the second. In these instances the pelvic diameters will be sufficiently ample, the soft parts

in a yielding condition, and the head, in whatever portion of the cavity it may be, will be found in a normal position. In such cases, and under such circumstances, the labor may be readily terminated by applying the forceps, but if it seems that the case needs no instrumental interference, but will probably result within a short time in natural delivery, Macrotys should be administered, in the usual small dose, every fifteen or thirty minutes; and if this fails, and symptoms of exhaustion manifest themselves, it will then be proper to administer Ergot, or apply the forceps and deliver at once; or if having administered Ergot and it fails, within a reasonable time, to stimulate the uterus to action, resort to the forceps without further delay. And, indeed, this course may be pursued in all cases of inefficient uterine contraction, owing to mere debility or exhaustion of the organ. Notwithstanding that Ergot has been so frequently employed to facilitate labor, with no apparent immediate pernicious results, yet the practitioner should ever bear in mind that it is a dangerous remedy at best, requiring much judgment and discrimination in its employment. The dangers attending its use to the mother are, rupture of the uterus, rupture of the perineum, inversion of the uterus, etc., to the child death, and more certainly if the cord is around its neck. And, although it has been employed with impunity in many cases, where the only indication for its use was the impatience of the practitioner—a regard to his own comfort and feelings, in preference to the safety of his patient—still, it is an agent whose action is always to be dreaded; and the success attending its administration in the instances just referred to have been the results of good luck, and not of any superior skill or wisdom of its prescribers.

Ergot has, undoubtedly, a specific action upon the uterus, which usually commences within twenty or thirty minutes after its exhibition; and the character of the contractions produced by it are materially different from those of natural labor. They are stronger and of longer duration, resembling a number of violent or spasmodic uterine contractions continued into one another without intervals. During a contraction, the circulation of the maternal blood in the uterus and placenta must be interrupted; and when this interruption occurs for a long continued time, as when effected by ergotic influence, preventing the necessary changes in the fetal blood, we should anticipate unfavorable results to the child, and not be unexpectedly astonished upon finding it born in an asphyxiated condition.

As it is not uncommon to meet with individuals whose constitutions are insusceptible to the specific influences of one or more drugs, so

must we expect to meet with females upon whom Ergot exerts but little or none of its peculiar action; and this want of susceptibility may account for many of the failures which have been recorded by authors. Another cause of failure has been, undoubtedly, the want of a recent article; for an inferior preparation of Ergot, often found on the market, does not possess the property of exciting uterine action, and, no matter how carefully it may be administered, it being a worthless article, failure will follow. One of the best and most reliable preparations is Lloyd's Ergot, the usual dose of which is from thirty to sixty drops. This preparation has the advantage over others, in that it may be used hypodermically, being free from Alcohol. In extreme cases it should be used in this way, by means of the ordinary hypodermic syringe, the dose being from five to twenty drops, repeated if necessary, governed by the effect produced. As constipation, or a disordered condition of the digestive organs, is frequently a cause of deficient uterine action, the practitioner should never administer Ergot without having first unloaded the bowels by enema, or by the administration of a mild laxative.

In the administration of Ergot to females during parturition, there are certain rules to be guided by, which are based upon the recorded experience and observation of many medical men, and which should be thoroughly impressed upon the mind of every individual who attempts the conduct of a labor; they are, briefly, as follows:

Ergot should never be given for the relief or comfort of the practitioner; where any deformity of the pelvis is suspected; where the head is suspected to be disproportionately large; where the presentation is beyond reach, or can not be determined; where there exists an obstruction in the soft parts, as rigidity, etc.; where there is a malpresentation; where there exists increased excitement of the nervous or vascular system; where there is a tendency to cerebral symptoms; and where the os uteri is not fully dilated. It should never be given while the woman's strength is greatly exhausted, lest the exhaustion produced by it be more excessive than her system can bear.

Ergot should be avoided, as much as possible, in first labors, lest rupture of the perineum ensue.

Ergot may be given, IN CAREFUL HANDS, in multiparæ, where the sole cause of delay is deficient uterine contraction; where the head presents and is low in the pelvis, the os uteri soft and fully dilated, the soft parts yielding and dilatable, and the membranes have ruptured; and the pelvis must be ample, with normal proportions between it and the fetal head. The patient must also be somewhat

exhausted, but without any symptoms of fever or inflammation; I must confess, however, that I prefer not to wait for any considerable degree of exhaustion before administering this article.

Some authors recommend the administration of twenty or thirty grains of Ergot in powder, or infusion, for a single dose; but in my own practice, in all cases where I have considered its use indicated and advisable, I have succeeded in arousing the contractions of the uterus, in fifteen or thirty minutes, by the use of one of the fluid preparations, either a reliable fluid extract or the specific tincture; my preference, however, is the article previously mentioned, and known as Lloyd's Ergot, in half to one drachm doses.

I would remark here, however, that among those practitioners who are acquainted with the parturient virtues of Macrotys, the employment of Ergot for the purpose of inducing (spasmodic) contractions of the uterus, is not so often required. It might be well, in the cases under consideration, to give this agent a fair trial before resorting to the ergotic preparations; more especially as it may be exhibited with greater safety, and at an earlier period of labor; beside, the contractions induced bear a greater resemblance to those caused solely by the natural powers.

It will sometimes be found that, although the contractions of the uterus may be aroused by the administration of Ergot, they are not of an expulsive character; in such cases the uterus contracts firmly upon the part of the child within it, preventing its advance, and causing its death by the pressure maintained around it, unless timely assistance be afforded by the employment of the forceps. Hence, it is recommended by our best accoucheurs to have a forceps at hand when this drug is exhibited. It must be recollected, however, that so long as the pains continue, with an advance of the head, *however slowly*, the pulse continuing good, no trouble in urinating, and no pain of the abdomen on pressure, ARTIFICIAL INTERFERENCE IS NOT REQUIRED; but in debilitated patients, in whom symptoms of exhaustion and fever appear, interference will be demanded, even though the head be very slowly advancing. And by delaying the necessary aid, the patient may die after delivery, from the shock of the labor, or from hemorrhage and retained placenta, or, should life be spared, sloughing of the uterus, vagina, bladder, and rectum may take place, rendering her subsequent existence painful and burdensome in the extreme.

I have known Sulphate of Quinia, in a dose of three to five grains, to increase the expulsive action of the uterus in several instances, in

which this action was inefficient; and yet a large number of practitioners have denied that it possesses such influence. In the cases under consideration, where the diminution of uterine action has no other cause than general or local debility, Crede's operation has been successfully employed. The woman being placed on her back, the accoucheur applies the palmar surface of his open hands upon the abdominal walls, immediately over the fundus and sides of the uterus, and, as soon as a pain commences, he makes firm pressure downward and in the direction of the axis of the superior strait, ceasing his efforts with the cessation of the pain and repeating them as soon as it recommences, and so on, until the head is born. This operation should not be practiced with violence or rudeness, and can only prove serviceable in cases of normal vertex presentation, and where the maternal pelvic diameters are sufficiently large. It increases the strength as well as the duration of the pains.

2.—PRECIPITATE LABOR may be due to violent or excessive action of the uterus, to great relaxation of the maternal tissues, to an abnormally large pelvis, to premature rupture of the membranes, or to the child being quite small. Women who are subject to dysmenorrhea, or who are well developed muscularly but at the same time excessively nervous, are liable to powerful uterine action; sometimes it appears to be hereditary. Occasionally ovarian excitement, mental excitement of any kind, and even hysteria, will give rise to an increase of the labor pains in the second stage. The dangers of such increased and hurried action of the uterus are, injury to the child, rupture of the cord, sudden detachment of the placenta followed by dangerous hemorrhage, inversion of the uterus, rupture of the uterus, vagina, and perineum, and syncope, etc.; and from the continuous and forcible straining of the woman, not unfrequently, subcutaneous emphysema of the neck and head, as well as more or less cerebral disturbance. If the practitioner is present at the time of this violent action, he must promptly employ means to palliate according to the cause. The woman must be kept constantly in the recumbent position, and, to lessen excessive uterine action, opiates, Gelsemium, compound tincture of Lobelia and Capsicum, Chloral-hydrate, Bromide of Potassium, or Chloroform, etc., may be used in full doses. All stimulus must be avoided; unnecessary examinations must be dispensed with; the bowels should be opened by laxative enema, followed subsequently by sedative; and the woman should not be allowed to bear down, but

rather encouraged to cry out loudly. When the pelvis is large, or the head of the child small, the methods named under Abnormally Large Pelvis may be pursued.

3.—Very rarely, the labor is interfered with by an IMPERFORATE OS UTERI, which may be suspected when the pains are regular, increasing gradually in force, pushing the lower segment of the uterus into the cavity of the pelvis, rendering it very thin, without any opening of the os uteri being discoverable.

There may be an *Agglutination of the Os Uteri*, the result of some previous inflammation of the part, and which may be detected by finding an indentation, or depressed fold at the center of the os uteri, without any opening; the pains will be regular, increasing gradually in force, pushing the lower segment of the uterus into the cavity of the pelvis, rendering it extremely thin; or the *Os Uteri may be obliterated*. These conditions are, however, rarely met with.

TREATMENT.—It may be that the os uteri is merely rigid and not dilatable, and the means recommended for this difficulty may be pursued, whenever the os can be discovered. Sometimes the os uteri is closed by agglutination, resisting the most powerful uterine contractions; in such instances, Dr. Rigby remarks, "A moderate degree of pressure against it while in a state of strong distension, either by the tip of the finger or a female catheter, is quite sufficient to overcome it; little or no pain is produced, and the appearance of a slight discharge of blood will show that the stricture has given away."

If no opening, however, can be found, it will become necessary to divide the presenting wall of the uterus, and form an artificial os uteri, through which the child may pass. A crucial incision is to be made upon the anterior-inferior part of the wall, as near the situation of the os uteri as possible, by means of a sharp-pointed bistoury; this knife is carefully passed along the left forefinger as a guide, and must not be pushed too deeply into the uterine wall, lest the presenting part of the fetus be injured. In performing the antero-posterior incision, care must be taken not to extend it so far, either forward or backward, as to injure the bladder or rectum. After the operation, the delivery may be left to the natural efforts.

It must be recollected, however, that it is frequently the case that from uterine anterior obliquity the os uteri will be higher up, perhaps entirely beyond the reach of the finger, and looking toward the promontory of the sacrum, and in which position it may remain for several

hours, retarding the progress of the labor, and a careful search should always be instituted previous to attempting any operation. If it be found thus elevated and inclined, the labor may be expedited by drawing it downward and forward with one or two fingers, in the direction of the axis of the superior strait, and holding it there until the engagement of the head will prevent a return to its former inclination.

Sometimes the orifice of the os uteri will be found so minute or contracted, from disease or other causes, that the head can not pass through it, even when dilated; for which the same course must be pursued as named for cancer of the os uteri, being careful in all operations not to carry the incisions into the rectum or bladder.

I would remark here, that some of these latter conditions, existing as causes of difficult labor, may be found present in the first stage of labor, when they should be as promptly attended to as the circumstances of the case will permit; preparing the parts, if possible, so that no delay may take place during the second stage.

3.—FIBROUS TUMORS of the CERVIX UTERI, are occasionally met with, instances of which are recorded, where the labors were finished without more than ordinary assistance, the mothers recovering, but the children being still-born. In such cases it is better to delay all operations, if there is the least possibility of the delivery being effected by the natural powers; but when this is impossible, from the excessive size of the tumor, from the want of proper uterine contractions, or from exhaustion of the mother, the child will have to be extracted by means of embryotomy, or, if this be impracticable, by the Cesarean operation.

4.—A POLYPUS may arise from the body or neck of the uterus, or it may be adherent to the walls of the vagina, and in either case present an obstacle to the delivery. It may be known by its firm, fleshy feel, its movability, its pear-shape, and its long, narrow neck; during labor it has sometimes been mistaken for the child's head.

TREATMENT.—If the tumor be detected at an early period of labor, it might be prevented from descending, by pressing it back during the absence of a pain, and holding it thus until the head has passed beyond it; but this is not practicable in all instances, and especially when the tumor is very large. In every case of this kind it will be proper to trust, for a time, to the resources of nature; but

when the parts become hot, dry, and swollen, and the uterine efforts inefficient, interference is required, for a too protracted delay is hazardous to both mother and child. The only operation necessary is the removal of the tumor by excision, and not perforation of the child's skull; for the danger from hemorrhage after the operation is not so great as to justify the destruction of the child. "The polypus should be drawn down as much as possible by a forceps proper for the purpose, a temporary ligature applied, and the stem cut through." "It is not likely that the ovum could be brought to maturity, if a large polypus occupied the cavity of the uterus; it is therefore fair to assume, that when a polypus is found to impede parturition, it must be attached to the mouth of the uterus, and therefore it can be the more easily traced to its origin, so that you have every facility to assist your diagnosis."—(*Murphy*.) If the presence of a polypus in the pelvic canal be discovered during the latter period of utero-gestation, and its size be such as to possibly render labor protracted and difficult, it should at once be ligated and excised, or it may be removed by the ecraseur, when this can be done.

5.—Other tumors may be present as impediments to the progress of labor, as FUNGOUS, or CAULIFLOWER TUMORS, which, from their spongy character and tendency to hemorrhage, may be mistaken for a placenta prævia; these may spring from either lip of the cervix, and when small may allow the birth of the child without any artificial aid, but when large they may have to be incised, or entirely removed by excision; in either case, there will be but a slight chance for the mother's recovery. Embryotomy and gastrotomy have both been performed in these cases, but generally with fatal results.

Among the causes due to the condition of the passages through which the child passes, are: 1.—RIGIDITY OF THE SOFT PARTS, especially of the perineum. In such cases a resort to Ergot, or the forceps, while the rigidity remains, is highly censurable. Occasionally, during the advance of the fetal head, the os uteri, instead of yielding, grasps the head during each pain, and prevents its further progress; this is apt to alarm the practitioner, who, having ascertained that the position of the head is correct, finds it to remain stationary, notwithstanding pain after pain continues with much force and severity. A careful examination, as to the presentation and position of the head, and its relative proportions with the pelvic diameters,

may determine the cause of the delay. The same cause frequently prevents the head from rotating.

TREATMENT.—Patience is required in these cases, in conjunction with the means named for overcoming rigidity in the previous chapter. In the instance of rigid os delaying the advance of the fetal head, it will always be proper to correct any abnormal position of the uterus which may be present, so that its longitudinal axis may correspond with the axis of the superior strait.

The following abstract is taken from *Braithwaite's Retrospect*:

“Dr. Washington has recently discovered that dry-cupping, applied to the lowest part of the sacrum, produces dilatation of the os uteri; and, applied higher up, contraction of the uterus. In a case, where the pains had endured fourteen hours without producing any perceptible effect, in consequence of rigidity of the os uteri, Dr. Washington applied a dry cup as low down on the sacrum as possible, so as to cover the origin of the nerves to the os uteri. Complete relaxation ensued; at the next pain, the head descended to the outlet; and at the second pain the patient was safely delivered; and that in less than ten minutes from the application of the cups. In tedious labor, the cup should be applied first to the lowest point of the sacrum, and if, in the course of ten or fifteen minutes, the patient is not delivered, another should be applied higher up, so as to cause the uterus to contract. *The lower one should always be on when the upper one is applied, so as to insure relaxation of the os uteri when the pains come on.*

“In retained placenta, the cups are to be applied higher up, so as to cause the uterus to contract at once, the relaxation of the os uteri being always sufficient after the fetus has passed. When Ergot is administered, the woman is delivered by main force, without any relaxation except that produced by the most fearful pains. By dry-cupping, two or three pains are sufficient, and the amount of suffering is not more than ordinary.”

2.—A CICATRIX IN THE VAGINA, will sometimes be met with, which will present an impediment to the delivery; it is usually the result of sloughing effected in a previous tedious labor, in which, the healing of the ulcer which remains after the separation of the slough, occasions a diminution of the diameters of the vaginal canal. An examination will detect, at some portion of the vaginal wall, a firm, unyielding band, which may occupy from three to six lines

longitudinally, or which may present merely a very thin edge, the thickness of a wafer. The difficulty will, of course, be proportioned to the firmness and extent of the cicatrix, and is always a serious obstacle to labor.

TREATMENT.—In these cases we should not interfere prematurely, but always wait and learn what the natural efforts can do; strong and energetic contractions, with the pressure of the fetal head, may overcome the difficulty. But where assistance is required, relaxation, effected by Lobelia or Gelsemium, administered by mouth, and by rectal enema of compound tincture of Lobelia and Capsicum will usually produce the desired dilatability, and the head will advance without any further delay. Where the cicatrix is of great extent, and very firm and unyielding, the inhalation of Chloroform will in some cases, relax the parts after the ordinary internal medication has failed; anasthesia should be carried to the extent of producing complete relaxation. Occasionally it happens that the cicatricial bands are so firm, that to induce dilatation more radical measures must be resorted to. It is advised in such cases, by excellent authority, to slightly incise the edges of the constricted part in three or four places, being careful to avoid the neck of the bladder, the rectum, and the two uterine arteries, which pass up from below on each side of the vagina; and for this purpose the incisions should be made one behind each groin, and one toward each sacro-iliac symphysis. The least snip is sufficient, as the advance of the head will probably widen it. After the delivery, a sponge or bougie, well oiled, should be introduced into the canal and changed two or three times a day, so that as the part heals, the diameters of the vagina do not again become lessened. The artificial increase of the vaginal passage by incisions, should be attempted with great care, and under the advice of counsel, for, however slight the operation may be, the advance of the head may cause the cut to widen and produce a much more extensive laceration than if the case had been left to the natural powers. Indeed, I am somewhat inclined to believe that the operation will very rarely be found necessary, where the previously-named treatment has been faithfully pursued. Sometimes considerable hemorrhage follows, and cases have occasionally terminated fatally. If the contractions of the uterus become inefficient, or unfavorable symptoms present themselves, the labor may demand a prompt termination by instruments, the use of which, in such cases, even with the greatest care, is apt to produce more or less extensive lacerations, and which are not without danger; and a knowledge of this fact may lead to the practice of patience and caution.

Where the practitioner is aware of this difficulty at an early period during gestation, or has reasons to suspect it, it is proper for him to explain the matter to his patient, and request an examination, when, if the constriction be found very great, he may induce premature labor, and thereby save the mother the hazards that she would run at full period; and the same course may be pursued with females known to be laboring under *Cancer of the Os Uteri*. In this latter condition of the cervix, at full term, when the labor is delayed thereby, it may become necessary to divide the diseased part sufficiently to admit the passage of the child. But, as this operation is only to be attempted for the child's safety, we must be certain that it is alive before performing it; the death of the mother is to be expected in such cases, no matter what course is pursued. *Cauliflower Excrescence* may be similarly managed.

3.—IMPERFORATE or UNRUPTURED HYMEN, may prevent the passage of the head. Impregnation may be effected without lacerating the hymen, which will be found perfect at the period of labor. It usually yields to the pressure of the head, but should it resist for too long a time, a slight incision may be made into it by the scalpel, taking care to prevent the laceration from extending into the perineum, as the head passes through the external orifice, by giving careful support to the perineum.

4.—Where, from a *continued* DELAY OF THE CHILD'S HEAD in the *Pelvic Cavity*, the circulation of the parts becomes interrupted, the soft parts are apt to swell, thereby offering still greater opposition to the advance of the head, and which may terminate in some structural lesion of the parts, if prompt and energetic measures be not adopted. Dr. Campbell observes, "Unless a practitioner has had the management of the patient from the commencement of labor, he is apt to view this variety of diminished capacity, as arising from original defect in the development of the bones themselves."

TREATMENT.—This condition may be overcome, to a great extent, by emollient vaginal injections, or injections of warm Lard or Oil, and if necessary, relaxation may be produced by the administration of Gelsemium or Lobelia. Should the pains be feeble, labor may be facilitated by an injection into the rectum of compound tincture of Lobelia and Capsicum, slightly diluted with water; or Macrotys, Ergot, etc., may be exhibited according to the directions

heretofore given, when treating of inefficient action of the uterus. The forceps have been advised, but I should, in these instances, fear some injury to the parts from their employment. I have frequently given the Gelsemium to cause relaxation, and when produced, have followed it with Ergot, with the happiest results, in cases requiring an expeditious delivery, where the pains were feeble, with a degree of rigidity or tumefaction of the soft parts.

5.—ŒDEMA OF THE LABIA MAJORA, is sometimes so great at the time of labor, as nearly to obliterate the vaginal entrance, rendering the delivery difficult and very painful; and the pressure of the fetal head in its passage over the tumefied parts, may cause an extensive rupture, or produce gangrene. The same treatment may be pursued as in the preceding instance, but, if the tumefaction be very excessive, or the labor considerably advanced, it is recommended to puncture the engorged parts with the lancet, in different places, the number of punctures depending on the extent and degree of œdema. But it must be remembered that the parts after having been punctured are liable to inflammation and sloughing.

CHAPTER XXXI.

ON DIFFICULT LABOR, FROM TUMORS, PELVIC DEFORMITIES, ETC.

6.—THE capacity of the pelvis is occasionally diminished during labor, by the presence of *Tumors in its Cavity*. These tumors may vary in their size, consistency, and pathological characters; they may be osseous, fibrous, adipose, steatomatous, sarcomatous or scirrhus, and the difficulty occasioned by them, will depend upon their size and degree of solidity. The history and surgical management of these tumors, together with other details, are not within the province of this work, in which I will merely refer to the diagnostic signs, and the indications for treatment when they interfere with the progress of labor.

A hard, bony tumor of extremely rare occurrence, termed EX-OSTOSIS, has been met with. It takes its origin from some portion of the osseous parietes, more commonly from the sacro-iliac symphysis, and sometimes from the first bone of the sacrum, from the last

lumbar vertebra, from the internal surface of one of the ischia, or from some portion of the posterior face of the pubic bones; and may be detected by its hard, knotty, and irregular feel, its insensibility to pressure, its immobility, and its projection into the interior of the vaginal canal, but always covered by the wall of this canal.

TREATMENT.—If the presence of the exostosis be known at an early period of gestation, it would be proper, according to circumstances, to effect an abortion, or induce premature delivery. At full term, it may be possible, that when the tumor is very small, the labor will progress without assistance, but when it is large, so as to materially interfere with the capacity of the pelvic diameters, the case assumes a more serious aspect. As we can not remove this obstruction by an operation, we must be governed by the nature of the case. If there is a probability that the head may pass, it will be prudent to wait until symptoms, demanding artificial delivery, present themselves, when the labor may be terminated by the forceps, or perhaps the perforator. When the diminution of the pelvic cavity, from this cause, is so great that the fetus can not pass through the vagina, the only chance for the mother will be in the performance of the Cesarean section, or the Porro operation, a description of which will be found in another part of this work. Fortunately, these instances are rare; I have never met with one.

7.—Other osseous tumors may occasionally render a labor difficult, as **OSTEO-SARCOMA** of the *pelvis*; this is very difficult to distinguish from exostosis; it presents greater inequalities, has a semi-cartilaginous softness, a degree of depressibility, and at some parts of its surface crepitation may be observed. From the depressibility of this tumor, the pressure of the head may flatten it, and effect a sufficient amplification of the parts to admit of the passage of the fetus; and should the natural efforts fail, or symptoms appear requiring interference, the labor may be terminated, according to circumstances, as in the preceding difficulty.

Sometimes the pelvic cavity may be diminished by bony protuberances, depending upon irregular consolidation of fractures in the part, or perforation of a carious acetabulum by the head of the femur, etc. In these cases, whatever may be the situation of the protuberance, the indications for treatment will be the same as in pelvic deformities.

8.—**ENCYSTED TUMORS**, may adhere to the cervix uteri, or to the vaginal walls; they are usually round, well-defined, movable, elastic, and sometimes fluctuating, and require the same treatment as

heretofore named for other tumors, as do also those of a *Scirrhus* or *Phlegmonous* character, *Polypi*, and various *Excrescences*, and *Syphilitic Vegetations* which may be found on the external parts of the generative organs.

From the great fatality which attends the presence of pelvic tumors, as obstacles to delivery, it must be regarded as a fortunate matter that their occurrence is not very frequent. Perhaps, less fatality would attend these cases, when known at an early period, and both mother and child be saved, were the induction of premature labor accomplished; although, it is by no means improbable, that even at the seventh month, instances may be met with which will offer an obstacle to the operation, and with these, the production of an early abortion affords the only chance of safety for the mother.

As a general rule of action, in all cases of tumors at full term, the first attempt of the practitioner should be to push the tumor up above the superior strait, beyond the head, so as to remove its interference with the advance of the latter. And the operator will be more likely to succeed by placing the patient on her knees, with the pelvis elevated, and the breast on the bed, in a line with the knees; this position deprives the patient of any tenesmic, or bearing-down power, beside causing the uterus to gravitate further from the pelvis, in a direction toward the epigastrium, and thus affording greater space into which the tumor may be placed. The manipulation may be conducted according to circumstances, with the hand in the vagina, or one or two fingers in the rectum, or both combined.

Where the tumor can not thus be placed out of the way, it is recommended to puncture it with a trocar, and in case this fails, to perforate the child's head, either of which operations do not always lessen the danger to the mother. In relation to puncturing or incising the posterior vaginal wall, in these tumor cases, Prof. Meigs remarks in his valuable work on Obstetrics, "I do not feel at liberty to recommend such an operation in this volume—an operation which could only be legitimately performed, upon due and mature consideration with the most acute and able practitioners of the vicinity. They alone should feel themselves vested with the authority to act under such terrible circumstances. I merely remark, *en passant*, that an incision into the posterior wall of the vagina, should it even have the good effect sufficiently to reduce the size of the tumor, fearfully exposes the patient to the risk of vaginal laceration from the subsequent distension by the descending head, and the escape of the child into the peritoneal sac.

A small aperture in the thin posterior paries of the tube, is more likely to yield and become a frightful laceration, than to resist the distending force of the advancing head." These remarks, from one of the most eminent accoucheurs of America, are entitled to the serious consideration of every medical man. Up to this period, I have met with only one instance of tumor offering an impediment to delivery; it was a cauliflower excrescence of the cervix, in a female with her fifth child, and terminated fatally.

DEFORMITIES OF THE PELVIS, are another cause of protracted and difficult labors, not unfrequently rendering the descent of the child impracticable, and are much more common to the women of Europe than to those of America. In another part of this work I have referred to the character of these malformations, and the method of determining them; it now remains to speak of the management of labor when they are present.

9.—The ABNORMALLY LARGE PELVIS, can scarcely be considered a deformity; but as the head of the child may meet with but little resistance in its passage through the canals, the various motions of flexion, rotation, etc., may not take place at all, or else be very imperfectly effected, and thus modify the labor. The consequences which may result in these kind of labors from deficient resistance, have already been named. Where the labor proceeds rapidly, the child may unexpectedly be expelled and fall upon the floor, even before the practitioner has deemed it advisable to make the usual preliminary preparations. In these cases, the best method of management, when called in time, is, to prevent the head from being too hastily expelled, by pressure upon it during a pain, giving firm support to the perineum until it is sufficiently yielding to allow the head to pass without causing a laceration, and to guard against hemorrhage by pressure over the uterine globe. After delivery, the patient should be kept in the horizontal posture, for a longer time than usual.

10.—The DWARFISH PELVIS, will offer an impediment to labor, according to the degree of contraction present; the labor may be accomplished by the natural powers, but it will be tedious, difficult, and attended with much suffering, and perhaps, from the long-continued compression of the head, result in the death of the child; or, it may be impossible for the child to be born without assistance. And, indeed, the same observations will apply to the *Unequally Contracted Pelvis*, and the *Obliquely Distorted Pelvis*.

The character of the labor, in these instances, will depend entirely upon the amount of deformity, which may be arranged as follows: 1st. Where the diminution of the pelvic diameters is not so great but that the child may be born, after a long time, by the natural powers, aided, in most cases, by the forceps, for the application of which there will be found sufficient space. 2d. Where the diminution of the pelvic diameters renders it impossible for the head to advance, and the forceps can not be applied for want of space, and, consequently, the only resource is the perforator. 3d. Where the pelvic canal is so reduced in size, that even a mutilated child could not be extracted.

The difficulty of the labor will not depend so much upon the positive size of the pelvic diameters themselves, as upon their adaptation, relatively, to the diameters of the fetal head; for, though the pelvis may be considerably contracted, yet, if the child's head be small, the labor may progress with comparatively little difficulty. A pelvis, whose small diameter is less than three inches, may generally be considered as one through which a living child can not pass; on this point, however, it may be proper to state, that accoucheurs vary in their estimate, some placing the limit at two inches, some at two and a half, and others at three, and even three and a quarter inches. In instances where the small diameter is less than three, but exceeds two inches, the labor will belong to the second arrangement or class, as given above; in such cases the forceps could not be employed advantageously, or if an attempt were made to use them, it would, undoubtedly prove useless, and perhaps injurious—the perforator and crochet would be demanded here. Authors likewise vary in the limit of measurement in these labors requiring the mutilating instruments, some placing it at one and a half inches, and others at one and three quarters, and two inches. When the small diameter is below two inches, the labor belongs to the third arrangement, and will, very probably, require the Cesarean operation before the child can be removed.

When there is a deformity of the pelvis, we are informed by Dr. Rigby, that the uterine contractions are frequently irregular during the first stage of labor, exerting but little influence in dilating the os uteri; the head remains high up, does not descend against the os uteri, and shows no disposition to enter the pelvic cavity—being pushed forward by the promontory of the sacrum, it rests upon the pubic symphysis, pressing forcibly against it. The mode of determining deformity at the superior strait, has been already explained in another part of the work. When the deformity is in the cavity or at the in-

ferior strait, it is detected with much less difficulty, as the parts are more readily reached; we will discover that the head makes no advancement during a pain, and if the finger be passed around during the absence of pain, the head will be found larger than the canal through which it has to pass. When the labor is allowed to proceed without interference in these extremely deformed pelves, various symptoms may present, which are generally met with during the second stage, as: inefficient contractions, exhaustion, and febrile symptoms, inflammation and sloughing of the soft parts, the result of long and forcible pressure of the head, and which may occur at either of the straits, or in the cavity, and may, likewise, penetrate into the bladder, or rectum; rupture of the uterus not unfrequently occurs in these cases. The child may have one or more bones of the cranium fractured, or the pressure may cause inflammation or sloughing of the scalp, or its death may be occasioned by strong and continued compression of the head.

TREATMENT.—This will depend much upon the class to which the deformity belongs; no positive or fixed rule can be laid down; if it be of the first class, a fair trial should be given to the natural powers, and if they be found insufficient to effect the child's expulsion, or if symptoms of exhaustion appear, assistance should be given with the forceps, provided there be space enough for their application. If the case belongs to the second or third class, I deem it advisable to operate at as early a period as possible, before the system of the patient has become exhausted from the long-continued exertion and sufferings of the labor, thereby materially increasing the chances of a favorable result. In instances where the perforator is indicated, the child is generally dead from the pressure, before the symptoms have arrived at a point demanding the operation. In all cases where deformity of the pelvis is suspected during labor, the practitioner should at once proceed by a careful examination to determine the character and location of the distortion, and the method of management should be decided upon only after a consultation with experienced accoucheurs.

The following extract from Dr. R. Lee's Lectures on Midwifery, relative to the treatment of pelvic deformities, will, no doubt, prove acceptable to the reader; he observes: "In cases of slighter distortion of the pelvis, it is impossible to predict at the commencement of labor whether the head will pass or not, and while it continues to advance and no unfavorable symptoms are present, you ought not to interfere—wait patiently and see what nature can do. If the head descends so low into the cavity of the pelvis that an ear can be felt,

and the os uteri is fully dilated, and there is room to pass up the blades of the forceps without the employment of much force, it is always proper, when delivery becomes necessary, to attempt to extract the head with the forceps. It is necessary, however, to remember that *sloughing is apt to follow the use of the forceps* where the soft parts have been long pressed upon by the head, and that perforation of the head is a much safer operation for the mother, when the distortion is considerable.

“The employment of the long forceps, in cases of distorted pelvis, has been recommended by Baudelocque, Boivin, La Chapelle, Capuron, Maygrier, Velpeau, and Flammant, whose works contain ample instructions for its use, before the head of the child has entered the brim of the pelvis; and the last of these writers has expressed his belief that the instrument is more frequently required while the head of the child remains above the superior aperture of the pelvis, than after it has descended into the cavity.

“In this country there are no practitioners of judgment and experience, who have frequent resource to the forceps, or who employ it before the orifice of the uterus is fully dilated, and the head of the child has descended so low into the pelvis that an ear can be felt, and the relative position of the head to the pelvis accurately ascertained. The instrument is very seldom used in England where the pelvis is much distorted, or where the soft parts are in a rigid and swollen state; but it is had resource to, where delivery becomes necessary in consequence of exhaustion, hemorrhage, convulsions, and other accidents which endanger the life of the mother. It is used solely with the view of supplying that power which the uterus does not possess.”

Again, “Where there exists a great degree of distortion of the brim of the pelvis, you may be unable to determine, positively, the distance between the base of the sacrum and symphysis pubis; and it is not necessary, for practical purposes, to do so with mathematical accuracy; but when it is under two inches and a half, you will readily discover, if you have had considerable experience, on making the ordinary examination, from the unusual manner in which the sacrum projects, that it is impossible for a child at the full period to pass through it. If labor has commenced at the full period of pregnancy, and you discover, before it has continued many hours, that the pelvis is greatly distorted, and that the child can not possibly pass alive, no advantage can result from allowing the labor to endure till the patient is exhausted, and you are satisfied that the difficulty can not be overcome

by the powers of the constitution. In such a case delay is dangerous, and there is nothing which can save the woman's life but opening the child's head with the perforator, and extracting it with the crochet. But this should never be had recourse to without a regular consultation of experienced practitioners, and before it has been placed beyond all doubt, by the most candid investigation, that the delivery can be accomplished in no other manner, so as to preserve the mother's life.

“In the greater number of cases of difficult labor from a high degree of distortion of the pelvis, which have come under my observation, where it has been the first child, the process has been allowed to go on till the efforts of the patient had been nearly discontinued, or had ceased entirely, and the favorable period for operating was lost. In some cases, even when the duration of the labor, and the local and constitutional symptoms, have made it manifest that such interference was justifiable and necessary, I have unfortunately delayed too long to deliver, in consequence of employing the stethoscope, and ascertaining that the child was alive. In cases of extreme distortion of the brim of the pelvis the proper practice is, to perforate the head as soon as the os uteri is sufficiently dilated to admit of the operation being done with safety, and afterwards leaving the patient in labor till the head has partially entered the brim, and the os uteri is considerably dilated. There can be no doubt that, in some cases, it is right to interfere before we certainly know that the child has been destroyed by the pressure; but we have nothing here to do with the question respecting the life or death of the child; our conduct will be biased if we endeavor to solve this question. We have only to determine positively, that delivery is absolutely necessary to save the mother's life, and that it is impossible for the head of the child to pass, till its volume is reduced. Paré, Guillemeau, Mauriceau, Portal, Puzos, Levret, Smellie, and all the best accoucheurs who have since appeared in Britain, have performed the operation of craniotomy in many cases of distortion from rickets and malacosteon, without reference to the condition of the fetus. ‘True religion and the common sense of mankind,’ observes Dr. Denham, ‘appear to have nothing contradictory. The doctrine they teach, of its being our duty to do all the good in our power, and to avoid the mischief we can, is applicable to the exigencies of every state, and we may be easily reconciled to it on the present occasion. In some cases of difficult parturition, it is not possible that the lives, both of the mother and child, should be preserved. Of the life or death of the mother, we can, under all circumstances, be assured: of

the life or death of the child, there is often reason to doubt, when we are called upon to decide and to act. The destruction of the mother would not, in the generality of cases which may bring the operation of which we are speaking under contemplation, contribute to the preservation of the child; but the treatment of the child as if it were already dead, with as much certainty of success as is found in other operations, secures the life of the parent. It then becomes our duty, and is agreeable to our reason, to pursue that conduct which will give us the most probable chance of doing good; that is, of saving one life, when two lives can not possibly be preserved.'

" 'The only means of effecting delivery,' observes Dr. Collins, 'where the disproportion between the head of the child and the pelvis is so great as to prevent us reaching the ear with the finger, is by reducing the size of the head and using the crochet. This is, however, an operation that *no inducement* should tempt any individual to perform, except the imperative duty of saving the life of the mother when placed in imminent danger. I have no difficulty in stating, that after the most anxious and minute attention to this point, that where the patient has been properly treated from the commencement of her labor; where strict attention has been paid to keep her cool, her mind easy; where stimulants of all kinds have been prohibited, and the necessary attention paid to the state of the bowels and bladder; that, under such management, the death of the child takes place in laborious and difficult labor before the symptoms become so alarming as to cause any experienced physician to lessen the head. This is a fact which I have ascertained beyond all doubt by the stethoscope, the use of which has exhibited to me the great errors I committed before I was acquainted with its application to midwifery, viz: in delaying the delivery, often, I have no doubt, so as to render the result precarious in the extreme, and in some cases even fatal.'

"The operation of craniotomy is now performed by all British practitioners of reputation, whether the child be alive or dead, if the condition of the mother is such as to render delivery absolutely necessary, and the head of the child is beyond the reach of the forceps, or where, from distortion of the pelvis, or rigidity of the os uteri and vagina, it can not be extracted if its volume is not reduced. This operation is performed from a conscientious belief and deep conviction that if neglected to be done at a sufficiently early period, the mother's life will be sacrificed, and the life of the mother is considered to be much more important than that of the child. Some continental writers

affirm, but I believe unjustly, that in England we have frequently recourse to craniotomy without due consideration, and without proper regard to the life of the child; and, whatever the state of the parent may be, they refuse to open the head till they can obtain certain evidence, which, in some cases, it is impossible to obtain, that it is dead. 'Nothing could excuse the conduct of the practitioner,' says Baudelocque, 'who would perforate the head of a child without previously knowing with certainty that it was not alive, a circumstance which can only authorize us to employ the perforator and crotchet.' By following this erroneous principle, the lives of both mother and child would, I believe, in the majority of cases, be sacrificed."

As will be noted, since reading the preceding pages, craniotomy, or the perforation of the skull and evacuation of the brain contents, is the operation commonly resorted to, to overcome the disproportion existing between the child's head and the parturient canal. Mechanical obstacles to natural delivery are more frequent than one would at first suspect; statistics indicate that fully seven thousand children annually, suffer embriotomy in the United States alone.

This subject is at present, owing to the terrible mortality reported, receiving the attention of the foremost obstetricians; whether craniotomy is ever justifiable if the child is alive is doubted; as to whether some protection should not be offered in the interest of the child, etc.

The saving of the mother's life should, under all circumstances, be the first consideration, and to that end every effort should be directed. But in guarding her interests, is there not often reckless sacrifice of the child's life? Should there not be an awakening to a keener sense of responsibility in such cases? In addition to premature labor, which I believe, as a rule, should be induced, when the diagnosis can be made at the proper time, there is but one other alternative suggested as a substitute to craniotomy, in cases where the diameters of the parturient outlet fall so far below normal as to render both natural and instrumental delivery impossible, and that is abdominal section. Abdominal section includes both the Cesarean and Porro's operations, which will be clearly defined in a subsequent chapter. In view of the advancement made in abdominal surgery, during the past few years, statistics clearly indicate a marked falling off in the death rate, and one of the operations looking to the saving of the child does not materially increase the maternal mortality. In view of this fact, craniotomy, it seems, should not be executed until the circumstances of each individual case are carefully considered, and the concurrence and

endorsement of eminent consultation is obtained. The reader is referred to the chapter on Abdominal Section for further details.

The operation of *turning* has been recommended, in cases of pelvic deformity, by some authors. The advantages of this method, revived by the late Dr. Simpson, of Edinburgh, Scotland, are, in the first place, that it can be performed at an early period of the labor, in which respect it has greatly the advantage over craniotomy, which must be performed at a later period, and after the woman has become more or less exhausted by her long continued sufferings, at the same time that she escapes the risk of injuries to the vagina and soft parts by instruments. It also affords a greater chance for the safety of the fetus. The idea upon which this operation is based is, that the bimestoid diameter of the fetal head being from half an inch to three quarters of an inch smaller than the biparietal, the head, thus turned, is somewhat wedge-shaped, the small part being at its base, the broad part at the vertex. By delivering the fetus in the manner named, the small part of this wedge is first brought down, and the broad part—especially as it is known that the biparietal diameter may be compressed to a considerable extent—may, very probably, likewise be drawn through the contracted parts. That there are instances in which this operation has proved successful, can not be doubted, if the statements published in our medical journals from many accoucheurs are to be believed. It appears to have been more successful in the dwarfish and the obliquely distorted pelvis, and when the anteroposterior diameter of the superior strait is not less than two and a half inches; notwithstanding, I consider the operation a very hazardous one, which should never be undertaken without due consideration and careful examination; for if it fails, the perils of the woman are increased. It must be recollected that—and especially in cases of pelvic deformity—it is not always possible to tell how the diameters of the head may compare with those of the pelvis; and, in turning, the head may be so placed as not only to expose the female to the pains and difficulties incident to the operation, but to the subsequent difficulties attending the employment of the forceps, or perhaps the perforator, one of which will most certainly be required in case of turning from error of diagnosis; beside affording not the least chance for the safety of the child.

After the delivery, every means should be employed to guard against sloughing; warm water should be injected into the vagina two or three times a day; or we may administer internally Hamamelis or Collinsonia. Febrile or inflammatory symptoms may be combated

with the Sp. Tr. of Aconite, Veratrum, Gelsemium, Macrotys, etc. Water, as hot as can be endured, in which a small amount of Borax or Chlorate of Potash has been dissolved, used as an injection, will often prove advantageous in connection with the internal agents; and, to relieve excessive weakness or prostration, it may become necessary in some cases to use stimulants, either Wines or diluted Brandy, until the patient reacts. Uterine tonics, as Macrotys, Pulsatilla, Phytolacca, or Nux Vomica, may be indicated; and later, the bitter or chalybeate tonics called for.

In all instances where a deformity of the pelvis is known to exist, and especially when from careful measurement, or the results of a previous labor, it is ascertained that a living child can not be born at full term, the induction of premature labor should be unhesitatingly performed; likewise, in cases where the life of the mother would be endangered from the difficulty or impossibility of delivery at this period. And in those cases where, at the seventh month, premature labor would be hazardous to the mother, on account of excessive diminution of the pelvic diameters, or distortions, I should not hesitate a moment in adopting measures to produce abortion.

The rule generally adopted in pelvic deformities is, that when the antero-posterior diameter of the superior strait measures from

- $3\frac{1}{4}$ to 4 inches, the forceps may answer;
- $2\frac{1}{2}$ to $3\frac{1}{4}$ " turning may answer;
- $1\frac{3}{4}$ to $2\frac{1}{2}$ " craniotomy required;
- Less than $1\frac{3}{4}$ inches, Cesarian section required.

If the existence of the deformity be known in time, the safety of the mother, and probably that of the child, may be secured in the *first two instances*, by the induction of premature delivery at the seventh month; in the *third instance*, turning may prove successful at the seventh month; in the *fourth instance*, the production of abortion at an early period is a justifiable procedure.

11.—Occasionally the CONDITION OF THE COCCYX may be such as to render labor difficult, as from ankylosis at the sacro-coccygeal articulation, from malposition due to previous fracture, from scrofulous disease, etc. It is only, however, when the coccyx, having become fixed, diminishes the diameter of the inferior strait, that it materially interferes with labor. An examination will reveal whether it be immovable or ankylosed, and the degree to which it interferes with the diameter of the strait, from a curvature slightly varying from the

normal to one at a right angle with the apex of the sacrum. These abnormalities of the coccyx are, fortunately, extremely rare causes of difficult labor. The treatment consists according to circumstances, in inducing premature delivery, use of forceps or perforator, or, breaking down the ankylosis, and which will be found an exceedingly difficult and painful operation, when undertaken during the progress of labor.

12.—Labor may be rendered difficult by VAGINAL VESICOCELE, or VAGINAL CYSTOCELE, in which the urinary bladder falls from its proper position in front of the uterus, and descends below the fetal head, overlapping the pelvic brim. The head, in its descent, pushes the fundus of the bladder before it into the excavation, forming a tumor of greater or less size at the anterior-superior part of the vagina, and which, if not timely relieved, may terminate very seriously. Sometimes the depressed bladder has been found directed to one side of the pelvis. The patient experiences a sensation of weight or fullness in the pelvis, a dragging sensation about the umbilicus, with a constant, but ineffectual desire to urinate; though, a small quantity of urine may pass during each uterine contraction. On an examination per vaginam, the finger detects a more or less oval tumor, usually in front of the pelvis, which is smooth, soft, and fluctuating during the intervals between the pains, but hard and tense while they are on, and painful on being steadily pressed. The head of the child is only partially covered by it, and may be felt by passing the finger above and behind it; but any attempt to slip the finger between the tumor and the symphysis pubis, will prove unsuccessful. Some care will be required lest it be mistaken for the bag of waters, or a hydrocephalic head, and improperly punctured.

TREATMENT.—This difficulty, whenever met with, must be promptly remedied. A male elastic catheter should be introduced into the bladder, having its point directed backward and downward, and to facilitate its introduction, the head may be slightly elevated with one or two fingers; the whole operation must be done during the absence of a contraction, and it may be effected more readily by entering the point of the catheter, with the hand below the vagina, and as it passes on toward the bladder, gradually raising the hand. After the urine has been withdrawn, the bladder must be pushed upward, by one or two fingers, above the top of the pubes, and held there till a pain thrusts the presenting part of the child below it. Should it be impossible to introduce the catheter, attempts must be

made, during the intervals, to press up the head, and at the same time also press up the tumor, when, frequently, the urine will be discharged without the aid of a catheter. If these attempts fail, and the progress of the labor is checked by the tumor, or a rupture of the bladder is feared, from its overdistension and from the pressure, the only resource is to puncture the presenting inferior surface of the bladder with a very fine trocar, having a consultation previously, if possible, with some skillful physician. In these cases, the patient should be carefully watched after delivery, evacuating the bladder at once, and not allowing it, for some days, to become distended, to any extent, with urine.

As these instances are more apt to occur in the first stage of labor, and when the bladder is more or less filled with urine, the necessity for keeping the bladder evacuated at such a time, will be readily seen. It may be proper to observe here, that no tumor in the pelvis, especially those presenting fluctuation, should ever be punctured, without having first employed the catheter, to ascertain that it is not vesical.

13.—Very rarely, a **CALCULUS IN THE BLADDER** may prove an obstacle to the labor, by projecting backward, and then pressed downward by the head, thus seriously bruising the bladder. It is not always easy to diagnosticate this difficulty; it will present as a hard tumor of greater or lesser size, circumscribed, painful on pressure, whether of the finger or child's head; and the diagnosis may be still further verified by the introduction of a sound or catheter into the bladder. Relief may be attempted, if the head has not descended too far, by pushing it up above the strait, and then pressing the calculus upward and anteriorly. If, from any cause, this can not be effected, vaginal lithotomy, with the consent of counsel, is advised, or, perhaps, craniotomy may be preferred.

14.—**COLLECTION OF FECES IN THE RECTUM**, may interpose as an obstacle to the passage of the head. These form a rather hard, irregular, inelastic tumor, which will be felt in the situation of the rectum, and which when pressed upon, downward, will slowly yield and cause the escape of feces. An examination per anum will at once detect the hardened scybalæ. This condition seldom happens except among careless and inattentive females, and a proper attention to the condition of the bowels at the early stage of labor, by the practitioner, will prevent its occurrence.

TREATMENT.—The feces should be removed by injections of warm water; or, should they be so hard and compact as to resist this method, it will then become necessary to remove as much as possible, by a scoop, spatula, or the handle of a spoon, after which administer an injection of warm water.

15.—A portion of intestine may become engaged in the *cul de sac* between the rectum and the posterior wall of the vagina, and form a tumor of variable size. This **VAGINAL HERNIA**, especially when it contains fecal matter, opposes the descent of the head, and, from the pressure of the head upon it, may terminate in serious inflammation, and even gangrene.

TREATMENT.—The hernia must be reduced as promptly as possible; the woman must be placed on her knees and elbows, with the hips elevated, and the intestine returned by pressure with two or three fingers. In some cases it may be necessary to relax the system by means of Gelsemium or Chloroform, when the patient will lie upon her back, with the thighs flexed upon the abdomen, and supported there by assistants, while the reduction is attempted. If the reduction can not be accomplished, the labor may readily be terminated by the forceps if required.

The principal abnormal conditions of neighboring parts that may interfere with the normal progress of labor are:

1.—**RELAXATION OF ABDOMINAL MUSCLES**, or **DIMINISHED POWER OF ACTION**, and which may be due to some existing disease interfering with the voluntary and reflex action of the associated muscles concerned in labor (respiratory and abdominal), as, diseases of the lungs, of the heart, of the abdomen (especially ascites), paraplegia, etc.; or, which may be the consequence of long-continued pain, or exhaustion, or the persistent and improper use of abdominal bandages or corsets. It is impossible to lay down any specific rules for treatment in these cases, as each one must be managed according to its character and indications; the great object during parturition is not to remove these causes, but to overcome their immediate influence at this time by the use of measures to expedite delivery. In some cases, a tight bandage around the abdomen, with compress beneath pressing upon the uterine fundus, and changed and retightened from time to time, as may be required from the advance of the labor, will be found to answer; Strychnia is frequently highly efficacious in some other cases; Crede's method, heretofore referred to may prove useful

in a third class of cases; Sulphate of Quinia, or electricity, with a fourth; in others again, the forceps may be required, or the perforator. If the accoucheur is attending a patient during gestation, who is laboring under serious disease of the respiratory, circulatory, digestive, or other organs, that may affect her seriously or dangerously at the period of parturition, it may become his duty to induce premature delivery.

2.—The ovary is liable to several diseases, which augment its volume to an enormous extent. Among these, dropsy and scirrhus are the most common; and if, at the time of parturition, an OVARIAN TUMOR is present, it may become a cause of difficult labor by impeding the birth of the child. Generally, as the ovary enlarges, it gradually rises from the pelvic into the abdominal cavity, where from its bulk, it may interfere with the development of the uterus and occasion a premature labor; or else, by pressing this organ to the side opposite, it may give rise to a difficult labor, by producing a uterine obliquity. Or it may interfere with the perfect action of the abdominal muscles during the expulsive stage of labor. Frequently, however, adhesive inflammation causes the ovary to remain within the pelvic excavation; or it may have been prevented from ascending into the abdominal cavity by the gravid uterus having already occupied that space; in either of which instances, if the female arrives at the full term of utero-gestation, the labor must be exceedingly difficult, depending, however, on the size and character of the tumor.

The diagnosis of an ovarian tumor, at the period of labor, is not always an easy matter. It will be found external to the vaginal coats, commonly toward the posterior part of the pelvis, within the recto-vaginal septum, will be more or less movable, elastic, and fluctuating, or hard and apparently solid, with some degree of sensibility. The dropsical tumor presents a round, smooth, and polished surface, while the scirrhus one presents nodules and irregularities. It is proper to examine in these cases both by vagina and rectum simultaneously, for the purpose of more clearly determining them from vaginal or uterine tumors.

TREATMENT.—In the management of these cases, much will depend upon the size and character of the tumor, bearing in mind that these tumors are “more likely to be moved out of the way of the child at the time of labor, than any other, and also more apt to give way and burst under the pressure of the head.”—(*Churchill*.) If the tumor be detected previous to the engagement of the head at

the superior strait, and it is movable, attempts should be made to push it up above this strait by steady pressure, so as to place it beyond the head. If this can not be accomplished, we must rely upon the natural powers, until the symptoms demand our interference. If the tumor be soft, it may be flattened, or ruptured, and thus allow the head to advance; if it be solid, we certainly should not interfere until we are compelled to. When the removal of the obstacle can not be accomplished, and interference is called for, it is recommended to puncture the tumor by means of a trocar, and evacuate the fluid; and if the contents of the tumor be viscid, or gelatinous, not passing readily through the canula; or if the tumor be formed of numerous cysts, not communicating with each other, the opening must be enlarged by making an incision into the tumor of half an inch or an inch in extent. When the tumor is located between the sacrum and rectum, it is recommended to make the puncture through the rectum; but in other instances through the vagina, as there is less danger from hemorrhage from the vaginal blood-vessels. Should a fibrous or polypus tumor be punctured, from an error in diagnosis, no great harm will be done. Great care, however, must be exercised in the examination of fluctuating tumors, especially when they are toward the pubic side of the pelvis, as the bladder may prolapse and present a fluctuating tumor, and which must not be punctured under ordinary circumstances.

If the tumor be solid, and can not be pushed up above the brim, or if the means previously employed fail to lessen its size, the delivery should be effected by the forceps, in all cases where it is possible; but where this can not be done, the only resource left is embryotomy, extracting the brain, and, if required, the contents of the chest and abdomen; unless, indeed, the physician is willing to subject the mother to the hazard of the Cesarean operation, or the extirpation of the diseased mass.

Dr. Merriman has recorded the history of eighteen cases of ovarian tumors impeding labor, in which nine mothers died, three recovered very imperfectly, and six escaped; of the children, fifteen were still-born, and three were born alive. He states: "*Twice*, the labor was effected by the pains, unassisted by the art of the accoucheur; but one of these women lost her life, and one of the children was still-born. *Five* times the perforator was used, after a longer or shorter duration of labor: three of these women died, another recovered very imperfectly, and one got well. *Five* times the labor was terminated by turning the child; all the children were lost, and only one mother recovered. *Three* times, the tumors having been opened, the labor was afterward

trusted to nature; two of these women recovered, but the other remained for a long time in an ill state of health; two only of the children were preserved. In *three* cases, the tumors having been opened, it was still found necessary to have recourse to the perforator; one of these women died, one remained in an ill state of health for eighteen months, and then sank under her sufferings; the third recovered." "Upon the whole," Dr. Merriman observes, "the evidence we at present possess, is more in favor of opening the tumors when they contain a fluid, than of any other mode of procedure; for of the nine women who recovered more or less perfectly, *five appear to owe their safety to this operation*, and of the children born alive, two were preserved by the same means."

In all these cases, the time of the operation must be determined by the constitutional symptoms, never delaying assistance after symptoms of powerless labor have commenced. The danger, in these tumors, arises, not so much from the obstruction to the labor, as from the influence exerted upon the disease itself; the pressure upon the tumor, and its consequent irritation, together with the debility, or exhaustion of the patient, occasioned by the prolonged and painful parturition, render her unable to sustain the effects of the irritation and nervous shock after the conclusion of the labor.

CHAPTER XXXII.

ON DIFFICULT LABOR FROM FAULTY CONDITIONS OF THE CHILD, MAL-POSITION OF THE HEAD, ETC.

OF the faulty conditions of the child or its appendages, that may occasion a protracted labor in the second stage, are:

1.—**SHORTNESS OF THE UMBILICAL CORD.**—It may be very short, naturally, not exceeding six or seven inches in length, so that it becomes torn as the trunk and inferior extremities are expelled, or its ligation and division may be required before these can be extracted. Most commonly, however, the shortness of the cord is accidental, occasioned by its being twisted several times round the neck or body of the fetus. The delay in the progress of the labor may be suspected to depend upon this difficulty, when in either stage of labor, the head not only retracts upon the subsidence of the pain, but does not advance with the usual force when the pain is present; some-

times the cord may be so shortened, and the head held up so high, as to prevent the practitioner from ascertaining the presenting part until the commencement of the second stage. Should the placenta be attached to some portion of the uterine cavity, near the neck, instead of toward the fundus, the above symptoms will be absent, and the diagnosis will be very obscure. But to whatever part it may be attached, a sensation of dragging, or tearing, with pain, will be experienced by the patient during the expulsive contractions, whenever the cord is shortened.

Should the case be suspected a shoulder presentation, from the fact that at the full dilatation of the os uteri, the presenting part can not be felt, the practitioner may be induced to attempt turning, but the introduction of the hand within the uterine cavity, at once ascertains the presentation of the head retained by a short cord. When, in the second stage, the head presents in a proper position, and is of normal size, the soft parts being free from any rigidity, the head in any part of the pelvic cavity, and the pains regular, shortness of the cord may be suspected when the head is found to recede very much with the cessation of the pains, and making no further advance when they are on, for several hours in succession. If two fingers, or even the whole hand, be passed up as high as possible, between the head and symphysis pubis, the diagnosis will be positive, upon feeling the cord passing around the neck.

TREATMENT.—If the pulsations in the cord be strong and vigorous, the best practice is to have patience, and leave the case to nature. If the pulsations are feeble, or gradually becoming so, we are recommended by Dr. Lee to deliver immediately with the forceps, and to carefully abstain from the use of Ergot. To attempt turning, in such a case, would be downright stupidity.

Prof. Meigs recommends loosening the cord by pulling upon its yielding end, and endeavoring to cast it off over the head. "This," he says, "can not always be done; if so, in any case, let the child pass through it by slipping it down along its body over the shoulders. If it seems impossible to slip the cord over the head or shoulders either, it should be let alone; and in a great majority of cases it will not prevent the birth from taking place, after which, the cord can be cast off. Should the child seem to be detained by the tightness of the cord, as does rarely happen, or in danger from the compression of its jugular vessels, the funis may be cut with the scissors, and tied after the delivery. Under such a necessity as this, a due respect for one's own reputation should induce him to explain to the bystanders the reasons

which rendered so considerable a departure from the ordinary practice indispensable." In the event of considerable hemorrhage, it would probably be judicious to place a ligature on the umbilical side of the severed cord. It is not always, however, that the cord can be reached, at least so as to pull it down, or otherwise operate upon it, and in such instances we must expect the means recommended by Prof. M. to be impracticable. Should the child be dead, as ascertained by absence of the beating of the fetal heart, and the cessation of pulsation in the cord, the labor should not be interfered with.

2.—HYDROCEPHALUS is occasionally a cause of difficult labor; in which case, notwithstanding the active expulsive pains and the dilatable condition of the os uteri, the head remains above the superior strait, and if the cause be not early ascertained, exhaustion, or rupture of the uterus ensues. The danger is in proportion to the size of the child's head; where the effusion is inconsiderable, the soft and flexible condition of the head may admit of its delivery, by gradually adapting it to the canal through which it has to pass, and lengthening its long diameter very considerably. But when the effusion is abundant, and the diameters of the head exceed those of the pelvis so much as to render delivery impossible, interference will be demanded. If a dropsical head be allowed to remain for any time impacted in the pelvic cavity, the continued pressure it exerts upon the soft parts would be very apt to produce sloughing; and in nearly all those cases, where the cause of the delay has not been early ascertained, a fatal result has followed to both the mother and child.

A hydrocephalic head may be detected by the extraordinary size of the head, and the great separation of its bones, by which the sutures are enlarged to the size of a finger, or more in breadth, and the fontanelles being also augmented, at times, to an extent equal to the hollow of the hand. The cranial bones are thin and softer than usual, and, likewise, during the pains, a sense of fluctuation will be perceived in some places, though this sensation may not frequently be observed, owing to the great compression the head undergoes. In nates or feet presentations the diagnosis is extremely difficult; the child's limbs are usually shrunken and wasted, and descend into the pelvic cavity until the head is about to engage at the brim, when, notwithstanding strong and continuous pains, any farther advance toward delivery is suddenly and persistently arrested. In cases where hydrocephalus is suspected, we should be very careful to obtain an accurate diagnosis lest we perforate the head of a healthy child.

TREATMENT.—But one course is to be pursued in a difficulty of this kind, when we are certain that the head can not be delivered naturally, or without endangering sloughing of the maternal soft parts, and when we are also *positive* that hydrocephalus is present. The necessity for being enabled to detect presenting parts, as well as their condition, is fully shown in a case of hydrocephalus; for should a careless or ignorant practitioner neglect to ascertain the positive conditions present in a difficult labor owing to this cause, and administer Ergot, or other agents, to excite energetic contractions of the uterus, he would be very apt to occasion a rupture of this organ; or should the head be expelled, it would be at the hazard of the mother's life, from sloughing.

In hydrocephalus, where the head can not be delivered by the natural powers, the best chance for the mother's safety is, to evacuate the effused fluid by puncturing with the perforator at an early period, while she has sufficient strength and vigor to withstand the shock; if the operation be delayed too long, she may die from rupture of the uterus, or from exhaustion. Cases are on record in which the accumulation was external to the cranial cavity, and it may likewise be lodged immediately within the cranium; consequently the puncture should be guarded, in the hope of evacuating the fluid without disturbing the cerebral structure, and saving the life of the child. After the evacuation of the fluid, the collapse of the bones will permit the labor to be terminated by the uterine contractions alone; and if these fail, means may be employed to excite them into greater activity, or the forceps may be demanded. Hydrocephalus is not always readily detected during labor, and when it is the discovery is usually too late for the mother to derive any advantage from it, as it almost always terminates fatally. It is very rarely the case that the pains occasion a rupture of the head, with escape of the fluid, and delivery—but we must never wait for this result after having made our diagnosis.

Should the case be one of pelvic presentation, and the head delayed from disproportion, the perforation must be made behind the ears; or, as has been suggested by Dr. J. Simpson, the fluid may be permitted to escape by opening any part of the vertebral canal; or the cranial cavity may be reached by perforating the base of the skull through the roof of the mouth.

Sometimes *Ascites*, or *Dropsy of the Abdomen*, may prevent the body of the child from being expelled; or this may occur from

Tympanitis, or a *Distension of the Abdomen with air*; in these cases, the perforator must be thrust into the child's body, and the air or fluid evacuated.

3.—Difficult Labor may arise from TOO EARLY A DEPARTURE OF THE CHIN FROM THE BREAST—an *Abnormal*, or *Premature Extension of the Head*—giving rise to the *Brow Presentations* of some authors. The nearer to the center of the pelvic cavity we find the posterior fontanelle, the greater will be the flexion of the head, and the more readily will it advance; and the nearer to the walls of the pelvic cavity we find this fontanelle, the greater will be the abnormal extension, or the departure of the chin from the breast, and the more slowly will labor progress; it is an excess of this departure which gives rise to face presentations.

In all normal vertex presentations the posterior fontanelle should be down toward the axis of the pelvic cavity, nearly in approximation with it; but in proportion as it recedes from this point, and approximates toward the side of the pelvis, will the anterior fontanelle be brought toward the center of the excavation. And at an early stage of the labor, this abnormal position may be known by finding this latter fontanelle near the center of the pelvis; but, if the head should have advanced as far as the inferior strait, one of the parietal protuberances will be at or near the pubic arch, while the anterior fontanelle will be found looking toward the inner perineal surface.

TREATMENT.—In a difficulty of this kind, the labor will speedily be finished, after having restored the flexion. To accomplish this, two modes are advised; the first is to be performed when the head has not entirely passed the superior strait, the os uteri being well dilated, the membranes ruptured, and the pains sufficiently energetic. And, when possible, it is always better to effect the adjustment at this period, than when the head has completely passed through the superior strait. Should any obliquity of the uterus exist, it must first be removed, according to the preceding directions; then introduce two or three fingers into the vagina, and, during the absence of pain, slightly elevate the forehead and hold it thus, supported by the fingers during one or more pains, until the vertex is found to descend, and the forehead to apparently ascend, when the fingers may be withdrawn, and the case left to the natural powers. The object of the operation is not to push the anterior fontanelle above the superior strait, which will be found a difficult task, but to make counter-pressure during a pain, to prevent it from descending any further,

thus allowing the vertex, or occiput to descend with the expulsive efforts of the uterus, and which descent will restore the normal flexion of the head. It may sometimes require the introduction of the whole hand, to effect this change. In performing this operation, the practitioner should be careful not to make any pressure upon the anterior fontanelle itself, but only in its neighborhood.

The second mode of operating is to be pursued when the head is completely in the excavation. The fingers, or half of the hand, if necessary, must be introduced into the vagina, and perhaps, also, within the cervix, so as to grasp the posterior-superior portion of the head, and during the absence of a pain, the head should be directed, or pressed in such a manner as to bring its anterior portion against that part of the pelvic wall facing it, while at the same time the fingers should obtain a purchase on the edge of the parietal bones, formed by the gliding of the occipital bone under them, and carefully pull the vertex down toward the center of the pelvis; this accomplished, the vertex should be retained thus, until a subsequent pain renders the change permanent. Thus, if the vertex be toward the left acetabulum, the head will be pressed toward the right sacro-iliac symphysis, while, at the same time, the vertex is pulled downward. The hand to be introduced in this operation must be that, the palm of which is directed toward, or may be applied upon, the vertex. In cases of this kind but little could be accomplished by making pressure upward, with the fingers upon the forehead, besides which, the upper edge of the os frontis being imperfectly ossified, the force required to elevate it might indent the yielding bone, and produce some injury to the brain; hence it is better to apply the power to the more perfectly ossified posterior edges of the parietal bones. Sometimes, but very rarely, a vectis will be required to effect the proper adjustment of the head when in the pelvic cavity.

4.—It was remarked in the Chapter on the Mechanism of Labor, that in occipito-posterior positions of the head, the movement of rotation usually changed them so that toward the latter period of labor, the occiput became placed under the pubic arch, the same as if the positions had been originally occipito-anterior. Sometimes, however, this change is not effected, and the head presents at the inferior strait, with the occiput to the sacrum, and the **FOREHEAD TOWARD THE PUBIC ARCH**. If the diameters of the pelvis and fetal head be normal, and the contractions of the uterus efficient, the delivery may be accomplished without any interference; the head

may be expelled presenting its occipito-frontal diameter to the antero-posterior diameter of the inferior strait, or the forehead may remain at the pubic arch until the posterior part of the head has passed over the perineum. This position of the head, notwithstanding it may not interfere with a safe delivery, may be considered a mal-position. In 29,684 cases recorded by various authors, the forehead was under the pubic arch in 87, or about 1 in 342½; and of 22 children born in this position, where the results were noted, 9 were lost.

As remarked above, the delivery may be safely accomplished by the natural powers; and where the head is large, or the pelvis narrow, or where both these conditions occur at the same time, the labor will be necessarily protracted, yet the child may be born without any serious consequences to its mother or self. But where the pelvis is considerably narrower than usual, the aid of the accoucheur will undoubtedly be required.

Cases of this kind may be ascertained by making a careful examination after the rupture of the membranes; the forehead not being as round as the occiput, will present a flatter surface which does not fill up the pubic arch, the anterior fontanelle will be found toward the pubic symphysis, the sagittal suture will be felt passing backward, in the direction (nearly) of the antero-posterior diameter, to the posterior fontanelle, which latter will be toward the sacrum. The parietal bones do not overlap one another as usual, the swelling of the scalp forms less rapidly, and sometimes the finger can be passed up behind the symphysis pubis and detect the eyes and root of the nose. If the head has suffered for a long time from pressure while in the pelvis, there may be some difficulty in detecting the sagittal suture and posterior fontanelle.

TREATMENT.—We should not interfere in these cases as long as the uterine contractions are regular, and the head advances, however slowly. But when the contractions cease, or are not sufficient to cause any advance of the head, a careful examination of the parts and of the fetal head must be made to ascertain their relative proportions, and such aid must be afforded as the circumstances of the case may require. On a preceding page I have given the mode of management recommended by Dr. Dewees for the purpose of overcoming the difficulty under consideration, which contemplates the anterior rotation of the occiput; the uterus being fully dilated, the membranes ruptured, the head occupying the lower strait, and the labor active, the index finger is to be placed against the edge of the sagittal suture, either before or behind the anterior fontanelle, and, in the

absence of a pain, the part is to be pressed toward the right or left sacro-iliac symphysis, as the primary position would indicate, and held steadily during the subsequent contraction of the uterus, reducing a fourth to a first, and a fifth to a second position. But although this frequently succeeds, it as often fails, and the practitioner will then have to resort to the forceps, especially where there is a failure of uterine power, or perhaps the perforator may be demanded; of course, the period for operating will be selected according to the degree of the difficulty, and the symptoms of the patient.

Not unfrequently, in occipito-posterior positions, there may be a delay in the descent of the head, *before* it has reached the inferior strait. The membranes having ruptured, the expulsive contractions are found to cause no advance of the head; an examination will detect the posterior fontanelle toward one of the sacro-iliac symphyses, and the sagittal suture may be traced upward and forward to the anterior fontanelle, which will be located behind the opposite acetabulum. In cases of this kind, an early interference is improper, the practitioner should wait until from the number of strong pains, he is satisfied that they are unable to advance the head, when, for the purpose of ultimately bringing the occiput under the pubic arch, he may grasp the cranium between the thumb and fingers, during the absence of a pain, and move the face toward the right or left ilium, according as it originally presented to the right or left acetabulum; being careful not to carry it into the hollow of the sacrum, notwithstanding the readiness with which so great a change might be effected, because, should the child's body fail to follow the rotation given to the head, a serious injury to the neck would, very probably, be the result; therefore, after having inclined the face to one of the ilia, the rest of the process must be left to nature. Should the manipulation fail, the face returning to its original position with the pain, it may be repeated several times until it succeeds. Should the head become impacted in the pelvic cavity before the operation is attempted, it is very probable that the forceps or the perforator, will be required to terminate the delivery. (See *Occipito-Pubal Position*, and *Occipito-Sacral Position*.)

5.—As a general rule, FACE PRESENTATIONS, may be included among natural labors, from the fact that they commonly terminate without any artificial aid; the labors, however, are very tedious and painful to the mother, and occasion considerable distortion of the child's features. They are now correctly considered to be deviations from a head or vertex presentation, and though delivery, in the greater

number of instances, is effected by the natural powers, still they should always be regarded as mal-positions.

When the head is in a proper state of flexion, the chin touching or approximating toward the breast, the presentation is always a normal one of the head, but if there is a premature extension or departure of the chin from the breast, the tendency will be toward a face presentation, in which the head gradually becomes bent backward so far as to ultimately place the face nearly flat across the oblique diameter of the superior strait, looking down into the pelvis; and this position almost always occasions a tedious labor, not unfrequently requiring the aid of the accoucheur.

In relation to the cause of the difficulty in this presentation, Prof. Meigs remarks: "The fetal head being an oval, five inches long, from the vertex to the chin, and more than three and a half inches wide at the widest part, it ought to make no difference, as far as the mere head is concerned, whether the chin or the vertex advances first in labor, because, in either case, the same circumferences of the head are presented to the planes through which they are to be transmitted. The foramen magnum of the occipital bone being equidistant from the vertex and chin, and situated on one side of the oval, the peculiar difficulties and hazards of these labors are attributable, rather to the nature of the articulation by which the neck and head are conjoined, than to the form of the head itself, when advancing with the face downward. The nature of this articulation is such, that extension of the head can not take place so well as flexion; hence the requisite dip of the occipito-frontal diameter is not effected in face cases without difficulty, and the consumption of much time.

"Let the reader figure to himself the state of the spinal column of a child, urged on in labor by powerful uterine contractions, directed to its expulsion with the face in advance. The inferior-posterior part of the head is pressed against the back of its neck, or between its scapulæ, which could not be the case without bending the cervical spine backward, like a bow, while the dorsal and lumbar vertebræ are curved in the opposite direction, causing thus a double antero-posterior curve, on which, in consequence of the elasticity of the two arches, much of the expulsive force is vainly expended; so that, though the power may be as great as in a common labor, it produces much less effect than in a common labor—a great part of every pain being expended in reproducing the greatest amount of curvature; for the elasticity of the two curves is such that they are straightened as soon as the pains subside, at least in some measure, while the rest of the

pain is used in pushing the face onward." These remarks of Prof. Meigs are undoubtedly correct, and should be constantly kept in view during a labor of the kind under consideration.

Face presentations are usually forehead presentations at first, in which there is a departure of the chin from the breast at an early period of labor, and an examination at this time, when the forehead presents, may mislead the practitioner, who, feeling the firm, globular presenting brow, rests satisfied that it is a head case, and only discovers his error when the labor has too far advanced for successful interference. In these cases, it must be remembered that the forehead presents first; and as the uterine contractions continue, extension of the head gradually progresses, so that one eye, then the other, the nose, the mouth, and the chin, are successively placed within reach of the finger. Instances have been met with, however, where the face originally presented at the brim.

The cause of presentation of the face is not satisfactorily understood; the most common belief is, that it is owing to uterine obliquity. For instance, if the obliquity carries the fundus far down on the right side, the vertex, instead of presenting in the direction of the axis of the brim, will present at a greater or less degree of inclination to it, and the expulsive contractions of the uterus, acting in the direction of its longitudinal axis, will force the fetus from above downward, and from right to left, so that the vertex will be made to glance upward into the left iliac fossa, and a shoulder be presented at the brim, or, the vertex being arrested at the left border of the superior strait, the forehead will present, extension will gradually be produced by the continuance of the pains, and the head be forced backward upon the child's back. This is, probably, the cause of the major number of these presentations, yet they are sometimes met with where there is no obliquity present, and it is very difficult to assign any correct reasons for their occurrence. Labor coming on before the position of the fetus is normally established, as in case of premature rupture of the membranes, etc., and excessive coughing, have been named among the causes, and may occasionally effect a change in the position of the fetal head; but where a face position is a primitive presentation, we have no satisfactory idea of its origination.

DIAGNOSIS.—If the examination be made at an early period of labor, before the membranes are ruptured, it will be very difficult to ascertain the character of the presentation, from the fact that the forehead, which only presents at that time, may readily be mistaken for a vertex position. But after the extension of the head is completed, and

the membranes have ruptured, the diagnosis becomes more easy: on one side of the pelvis we find the forehead imparting the sensation of a rounded, solid surface, through which the anterior portion of the sagittal suture may be felt traversing; carrying the finger slowly along to the opposite side, in the median line, it meets with a triangular elevation, increasing in size as it leaves the forehead, and crossing the pelvis somewhat obliquely, and which is the nose; at its base will be found two small openings, the nares, which always look toward that portion of the pelvis where the chin is situated, and which consequently afford great aid in determining the position. On either side of this triangular protuberance, at its apex, the eyes will be felt as two soft tumors, surrounded by a circle of bone; and the examination should be gently and carefully conducted, lest the eyes become seriously injured or even destroyed. A short distance from the base of the nose will be found the mouth, conveying the sensation of a transverse fissure bounded by the superior and inferior maxillary arches. At the commencement of labor, in a face presentation, the mouth is, as it were, substituted for the anterior fontanelle, the nasal bridge for the sagittal suture, and the orbital ridges, according to the position, for the coronal or lambdoidal suture. As the face does not look directly downward, but presents with one cheek more dependent than the other, the malar bone and eye of the dependent part will be the first points with which the examining finger will come in contact.

If a long time has elapsed after the rupture of the membranes, before the delay in the labor induces the accoucheur to make a more careful examination, the diagnosis will be more difficult; hence the necessity for making a thorough examination immediately or very soon after their rupture, in all cases of labor. The tedious progress of the head, and the compression which it undergoes, cause the face to become very much tumefied; the cheeks being greatly swollen and at the same time pressed toward each other, a fissure is formed between them, in which the diagnostic characters of the face are concealed, and which might lead the practitioner to confound them with the nates and their intervening fissure. The lips also swell, become wrinkled, and turn in, presenting a rounded orifice instead of the usual transverse fissure, and which has been mistaken for the anus, but which may be at once known by introducing the finger into it, and feeling the tongue and alveolar processes.

Whenever a case of face presentation is met with, it should be announced to the friends of the patient, together with the probability of

considerable distortion of the features of the child when born, else its frightful appearance may be attributed to some improper violence, or perhaps want of skill, on the part of the medical attendant. If the labor is a tedious one, the appearance of the new-born child will be very repulsive, its face swollen, the eyelids in a tumefied state, and one or both eyes closed, the nose also swollen to an enormous extent, and the whole features presenting a dark or livid appearance, scarcely being recognized as the countenance of a human being. These appearances generally pass off in a few days. Sometimes, when the labor is very tedious, the congestion or stasis of the blood extends even to the brain, creating an apoplectic condition, and occasionally the death of the child.

Although the face may present in various positions, yet for practical purposes, the two heretofore named are all-sufficient, viz.: the *left mento-iliac*, and the *right mento-iliac*. And these names will apply to the positions when the chin is to the left or right side of the pelvis, whether they be directly transverse, as more frequently happens, or have the chin turned more or less anteriorly near the body of the pubic bone, or posteriorly toward the sacro-iliac symphysis. So that, for instance, should the face be placed in the pelvis exactly in a transverse position, with the chin to the right ilium, or obliquely with the chin toward the right sacro-iliac symphysis, or toward the right pubic bone, the obliquity of the position does not, in either case, interfere with its claim as a right mento-iliac position; and so of the left, when the chin is placed at the left side of the pelvis. The transverse positions of face cases being the most frequent, are regarded as the primitive positions, from which the oblique positions are derived during the progress of labor.

A.—MECHANISM OF LEFT MENTO-ILIAC POSITION.

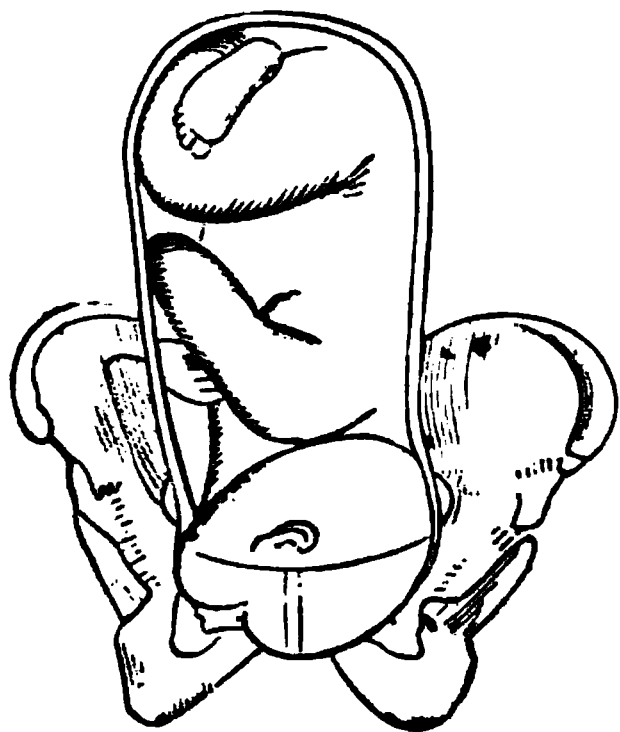
This position is not so frequent as the right mento-iliac, and is usually termed the second position; but for the purpose of preserving regularity, and aiding the student in recollecting all positions, as being successively to the left, right, and front, I have given it as the first position. As a general rule, previous to the rupture of the membranes, the forehead will be found near the center of the superior strait, the chin being placed at the left, and the anterior fontanelle at the right side of the pelvis. The mento-bregmatic diameter of the fetal head corresponds to the transverse diameter of the upper pelvis, the bi-

temporal of the former to the antero-posterior of the latter, and the occipito-frontal diameter of the head is in a direction with the axis of the superior strait. The back of the child is toward the right side of the mother, and its abdomen toward her left side; its left side is in front, and its right behind; the feet are above and to the left. (*Fig. 56.*) (*Figures 56, 57, and 58, represent the right mento-iliac positions, but as far as the mechanism of labor is concerned, they will answer to illustrate the left mento-iliac positions.*)

As soon as the membranes rupture, and the expulsive contractions commence, the head being in a state of moderate extension, and meeting with resistance, *forced extension* takes place, which gradually causes the face to present at the superior strait instead of the forehead, as heretofore explained. The fronto-mental diameter of the head now corresponds, instead of the mento-bregmatic, to the transverse diameter of the brim; the bi-temporal to the antero-posterior, and the fronto-mental circumference offers

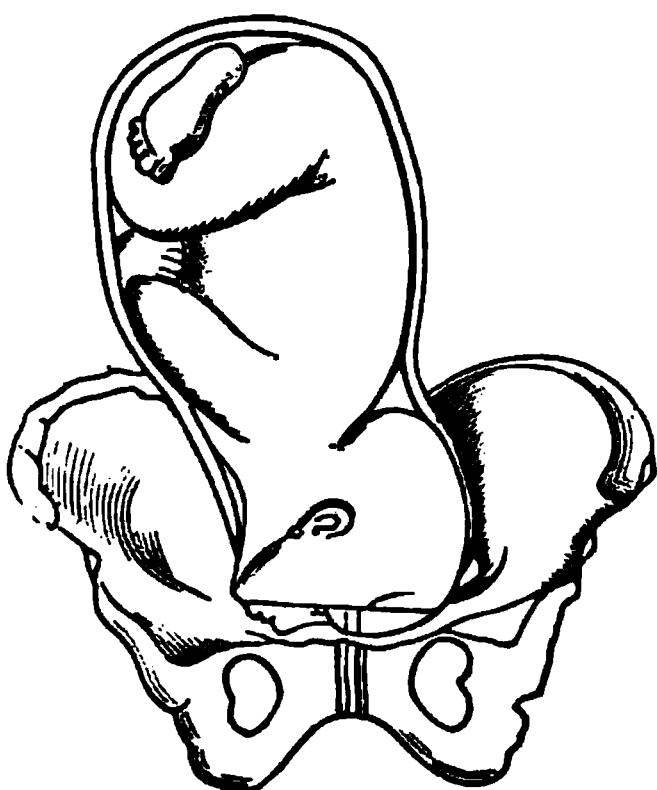
to that of the superior strait; the body of the child remains unchanged, and a line drawn from the upper lip of the child to the posterior fontanelle, will give the direction of the axis of the upper strait.

FIG. 57.



soft parts, the anterior surface of the spine of the left ischium [which

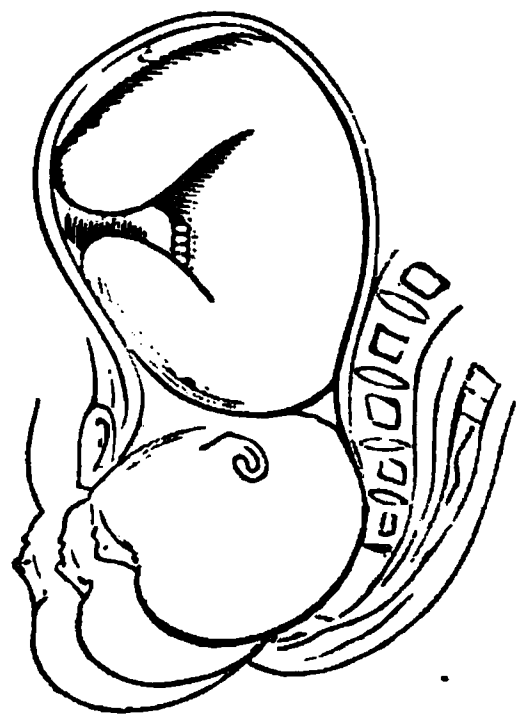
FIG. 58.



(*Fig. 57.*) As soon as the extension of the head is completed, it engages in the pelvic cavity and *descends* as low as possible, or as far as the length of its neck will permit. The depth of the lateral part of the pelvis is three inches, and as the length of the neck does not reach this measurement, the descent of the head is limited, and must cease at some point short of the pelvic floor; for if it advanced further, the head and part of the child's breast would be contained in the pelvic cavity at the same time, a thing not ordinarily possible. The resistance of the

acts upon the right side of the chin], and the inclined pelvic planes cause the head to *rotate*, carrying the chin from left to right, in front and behind the symphysis pubis, while the forehead passes from right to left, backward into the hollow of the sacrum. Should the chin fail to rotate toward the symphysis pubis, the labor will be immensely difficult, if not altogether impossible, because the occipito-mental diameter of the head must, toward the termination of the process, offer to the antero-posterior of the inferior strait, or nearly so, before the head can be born. The descent and rotation of the head being now completed, the process of flexion commences, the pains push the body of the inferior maxillary bone, and finally the fore-part of the neck against the posterior surface of the pubes, which arrests its progress, and, in consequence of the impossibility of any further descent of the neck, the expulsive force is exerted at this time, principally upon the occiput, and the head is gradually delivered by successively presenting at the vulva, first the chin, then the mouth, nose, eyes, forehead, anterior fontanelle, posterior fontanelle, and occiput, which latter has to traverse the whole anterior sacral surface, a distance of about five inches and a quarter; and during the delivery the perineum becomes greatly distended. As the chin emerges under the pubic arch, there is not a correspondence of the whole measurement of the occipito-mental diameter of the fetal head with the antero-posterior diameter of the inferior strait, as shown in the linear representation of the various degrees of the head's disengagement, in *Fig. 58*, in which, while the head is in the same position, the occiput is represented as departing more and more from the shoulders. The head being disengaged, the motion of restitution follows, placing the occiput to the right side of the mother, and which, as in vertex presentations, is owing to the rotation of the shoulders at the lower strait. The head being delivered, the expulsion of the body is effected as in ordinary vertex positions. It must be recollected, that in this position the left side of the child's face is anterior and rather more depressed than the other side upon entering the superior strait, and on making an examination, the finger comes in contact with the left eye or malar bone, upon which part is formed the primary tumor. Nægèle observes that the swelling forms "first upon the upper part of the"

FIG 58.



left "half of the face, which in this species of a face presentation (*left mento-iliac*) is always situated lowest." "If the progress of the head through the external passages be unusually rapid, this is the only tumefaction observed; but if it advances slowly, and the head remains a long time in the cavity of the pelvis before it actually enters the vagina, the inferior half of the *left* side of the face, viz.: part of the *left* cheek, will be remarked after birth as being the principal seat of the swelling," a secondary tumor being formed there.

It is sometimes the case, especially when the chin is situated rather posteriorly, that previous to the movement of rotation a certain degree of flexion takes place, which causes the forehead to descend to the pelvic floor, after which the chin rotates to the pubic symphysis, and the delivery is accomplished as in other instances.

B.—MECHANISM OF RIGHT MENTO-ILIAC POSITION.

This is the most frequent of the face presentations, and is usually named the first position. The positions of the diameters of the fetal head, and their relations with the pelvic diameters, will be the same as in the left mento-iliac cases; the exceptions are, that in the present position the forehead corresponds to the left iliac fossa, and the chin to the right iliac fossa; the child's back is toward the left side of the mother, and its abdomen toward her right side; its right side is in front, its left behind, and the feet are above and to the left. (*Fig. 56.*) The right side of the face is anterior and more depressed than the other side, and the finger comes in contact with the right eye or malar bone, and upon which part is formed the primary tumor. The mechanism in this case is precisely similar to the one just described, with the exception that rotation takes place from right to left, the spine of the right ischium being the directing agent and acting upon the left side of the chin.

TREATMENT.—Although face presentations are accidents, or deviations from vertex positions, yet, as a general rule, the natural powers will be found adequate to safely terminate the labor, and the practitioner must not interfere as long as the pains are regular and energetic, the parts cool, the patient free from febrile symptoms, and the head advancing, however slowly. If, however, the pains become feeble and insufficient, or accidents should occur, then interference will be required. Turning was formerly recommended by authors, but from the difficulty, and the danger to both the mother and child, attending this operation, it is at the present day very rarely attempted, and is not advised by recent authorities.

In relation to face presentations, Dr. Dewees has recommended the following manipulation:

"In the first and second positions, we must have the concurrence of the following circumstances, before we attempt the reduction of the head; first, the uterus must be sufficiently open to permit the hand to pass, with little or no difficulty; second, the head must not have entirely passed the superior strait; third, the waters must have been recently expended. If these advantages combine, after having the woman properly placed, a hand must be passed into the uterus; and the choice of the hand is a matter of the first consequence to the success of the operation; the governing rule is simple, and easily remembered; namely, the hand which is to the side on which the vertex and forehead are placed; that is, in the first, the right hand must be used; because, when before the patient, the right hand offers to the left side of her, or the pelvis; if the second be the position, the left hand must be employed, for a like reason. [These positions are reversed, in my arrangement. K.]

"In the first position of the face, we pass the right hand into the uterus in such a manner as shall put the back of the fingers to the posterior part of the pelvis, or before the left sacro-iliac symphysis, and place them on the side of the head, while the thumb is pressed against the opposite side; the head is then to be firmly grasped, and raised to the entrance of the superior strait. When the head is thus poised, the extremities of the fingers are to be carried over the vertex, while the thumb is moved to the center of the upper part of the forehead; the fingers are then made to draw the vertex downward, while the thumb tends by its pressure, to carry the face upward, thus executing a compound action upon the head. All this, it should be remembered, must be executed in the absence of pain; if we find, when pain comes on, that the vertex moves sufficiently downward, and the face upward, to give assurance it will now descend, we may withdraw the hand, and trust the rest to the action of the uterus. But if, on the contrary, upon the accession of the pain, we find the face still has a tendency downward, we may be certain that the reduction is incomplete; and we must again and again attempt it, in the absence of pain, if it be necessary: for, under the circumstances I have stated, we are pretty sure of success under a well-directed management.

"In the second position, we employ the left hand, under the conditions I have stated for the first, and act in every respect as directed for that presentation."

It is extremely doubtful whether this manipulation can really be effected; in the first place, if the waters have been discharged, it will be very difficult, if not impossible to introduce the hand as stated, from the brim being occupied by the head, and the fetus being directly pressed upon by the uterine walls, besides the attempt will be exceedingly painful. In the second place, a failure will expose the mother to the still more dangerous necessity of pelvic version, the forceps, or even the perforator, and more especially should the presentation be complicated with descent of an arm or foot, or prolapse of the cord.

Most generally, the existence of a face presentation is not ascertained until the part has so far descended into the pelvic cavity, as to render it impossible, either to push it into the upper pelvis, or effect the above operation of bringing down the vertex. In such instances, it will become necessary to be guided by the general principle of obstetrics, to wait until symptoms present which indicate the need of artificial aid, and then make use of those means best calculated to overcome the difficulty. The vectis will probably be found the most appropriate instrument in a majority of cases; if the head be low down, and particularly if rotation does not occur, the forceps may, perhaps, be employed advantageously—though the selection of the instrument must depend upon the peculiar character of the case, and the judgment of the practitioner. If these means fail, the only resource is craniotomy. The perforator, however, will not be needed except in extreme cases; and should not be resorted to until all hope of delivery by the forceps is abandoned, and only then after the concurrence of another physician. The reckless sacrifice of the child's life is too often the case under such circumstances. The delivery can usually be accomplished with the forceps, where operative interference becomes necessary. In these cases, much patience, gentleness and sympathy are required on the part of the practitioner, who must encourage his patient from time to time, and endeavor to keep her from becoming depressed and discouraged.

I have not, heretofore, named the only and positive rule to be observed in all face cases, whatever may be their position, viz.: *to bring the chin to the pubic arch*, so that the original flexion of the head may be restored as soon as possible after the delivery of the chin; and in by far the greater number of instances in which this rotation is effected, the labor will terminate without any formidable results. If this rotation can not be effected, and the forehead should present at the pubic symphysis, the practitioner must make use of means the most applicable to the emergency. Professor

Meigs remarks, that in all face presentations, "the great doctrine is, to bring the chin to the pubic arch, because the chin, being the mental extremity of the five-inch mento-occipital diameter, may escape by gliding an inch downward, behind the symphysis pubis; whereas, if it be directed backward to the sacrum, it must slide five inches down the sacrum and coccyx, and from three to three and a half inches over the extended perineum before it can be born; but five inches and three inches make eight inches. The child's neck is not eight inches long. Therefore, before the chin can slide down the sacrum, and off the anterior edge of the extended perineum, a good part of the child's thorax must be pressed or jammed into the excavation along with the head, the vertical diameter of which alone is more than three and a half inches." This is a correct representation of the matter, and the practice alluded to, of bringing the chin to the pubic arch, is the one at present universally pursued by all scientific accoucheurs.

6.—EAR PRESENTATIONS, or *Presentations of the Side of the Head*, occur very rarely; they are considered as deviations from the vertex presentations, and occasioned by an undue obliquity of the uterus, or, perhaps, in some instances, an abnormal amount of liquor amnii. In 20,517 instances, they have been met with only six times, five of which were of the left side of the head, and the remaining one of the right. They are known by the presence of an ear at the superior strait. Each side of the head may present in three different positions, which are determined by the relations of the ear to the maternal pelvis; they have been classified as follows:

PRESENTATION OF THE RIGHT SIDE.

- 1st. *Position*.....Lobulo pubal.
- 2d. *Position*.....Right lobulo-ilias.
- 3d. *Position*.....Left lobulo-ilias.

PRESENTATION OF THE LEFT SIDE.

- 1st. *Position*.....Lobulo-pubal.
- 2d. *Position*Right lobulo-ilias.
- 3d. *Position*.....Left lobulo-ilias.

DIAGNOSIS.—As there is no part of the fetal body likely to be confounded with the ear, its detection may be accomplished with but little difficulty. The ear may be felt, with the surrounding bony

head; we know the face to be situated anterior to the tragus, and the occiput to be behind the helix, or circumference of the ear, so that from these marks we may readily determine the position of the head.

A.—In the LOBULO-PUBAL POSITION, *of the Right Side of the Head*, the lobe of the ear, as well as the base of the cranium, look toward the pubes, the long diameter of the external ear presents in the direction of the antero-posterior diameter of the superior strait, the vertex is at the promontory of the sacrum, the convexity of the helix and the occiput are directed toward the left side of the pelvis, and the face and tragus toward the right side. The child's back is toward the left side of the mother, its front toward her right side, its left side looks posteriorly, its right side anteriorly, and its feet are above and to the right.

This is a deviation of a left occipito position, produced by an anterior obliquity of the uterus, and should be remedied by placing the patient upon her back, with the pelvis somewhat elevated, raising the fundus upward and backward, and then applying a bandage firmly around the abdomen. The obliquity removed, the vertex passes in front of the sacral promontory, the head rises, and gradually recovers its original left occipito position, and the delivery is terminated naturally.

B.—In the RIGHT LOBULO-ILIAC POSITION, *of the Right Side of the Head*, the lobe of the ear looks toward the right side of the pelvis, the long diameter of the external ear presents in the direction of the transverse diameter of the pelvis (or nearly so), the vertex is at the left iliac fossa, the convexity of the helix and the occiput are directed toward the pubes, and the face and tragus toward the sacrum. The child's back is anteriorly, its front posteriorly, its left side is toward the left of the mother, its right side toward her right, and the feet above, and toward her left, and back.

This is, likewise, a deviation from a left occipito position, occasioned by an extreme right lateral uterine obliquity, and should be managed by placing the female on her left side, elevating the fundus upward and to the left, and applying the bandage as before. The obliquity removed, the head engages in the brim, and the delivery terminates naturally.

C.—In the LEFT LOBULO-ILIAC POSITION, *of the Right Side of the Head*, the lobe of the ear is toward the left side of the pelvis, the long diameter of the concha is parallel, or nearly so, to the pelvic transverse diameter, the vertex is at the right iliac fossa, the

convexity of the helix and the occiput look toward the sacrum, and the face and tragus toward the pubes. The child's back is toward the maternal back, its front anteriorly, its left side toward the right of the mother, its right toward her left, and the feet above, and toward her right, and front.

This is a rare presentation, and is a deviation from a left occipito-posterior position; it is produced by an extreme left lateral obliquity. The treatment is similar to the previous instances; the female must be placed upon her left side and bandaged; the vertex engages in the brim, and the labor terminates as in a left occipito-posterior position.

In these lateral obliquities, the object of the bandage is to prevent the uterus, after a change in its position has been effected, from returning to its original inclination.

D.—When the LEFT SIDE OF THE HEAD presents, the relations with the pelvis are the same as in the preceding instances, but the partial relations are inverted. Thus, in the LOBULO-PUBAL POSITION *of the Left Side of the Head*, the lobe of the ear is toward the pubes, the long diameter of the concha corresponds with the pelvic antero-posterior diameter, and the vertex is at the sacral promontory; but the convexity of the helix and the occiput are directed toward the right side of the pelvis, and the face and tragus toward the left. The child's back is toward the right side of the mother, its front toward her left side, its left side looks anteriorly, its right posteriorly, and its feet are above and to the left.

E.—In the RIGHT LOBULO-ILIAC position of the left side, the lobe of the ear will be directed toward the right side of the pelvis, the vertex toward the left, the occiput and convexity of the helix toward the sacrum, and the face and tragus toward the pubes. The fetal back will be directed backward, its anterior plane in front, its left side to the right of the mother, its right to her left, and its feet above, toward her left and front.

F.—In the LEFT LOBULO-ILIAC position of the left side, the lobe of the ear is to the left side of the pelvis, the vertex to the right, the convexity of the helix toward the pubes, and the tragus toward the sacrum. The fetal back is directed to the front of the mother, its front to her back, its left side to her left, its right side to her right, and its feet above, toward her right, and back. All these mal-positions are to be rectified upon the general principles described above; if these fail, efforts may be made to bring down the vertex, when the head is at the brim, by a manipulation (somewhat similar to that recommended

by Dr. Dewees for restoring face presentation to vertex, and which is extracted from his *Obstetrics* and noticed in the present chapter), in which the head will have to be slightly elevated, and then have lateral or anterior pressure or pushing made upon the vertex in a direction toward the chin, followed by a drawing down of the vertex. It may be best performed, after reduction of the uterine obliquity and the application of the bandage, by placing the patient on her hands and knees, with the hips elevated and the shoulders depressed, which position will, in a measure, remove the weight of the child's head from the brim, and thus facilitate the operation. This operation, however, will seldom be needed, and may frequently fail. In cases requiring further aid, it will be prudent to wait, in order to ascertain the adequacy of the natural efforts; and should these fail, or the usual symptoms demanding interference present themselves, the delivery must be terminated by the vectis, the forceps, or the perforator, as the exigencies of the case may require. Turning has been recommended, previous to the rupture of the membranes, when the os uteri is considerably dilated, soft, and dilatable, and may possibly be advantageous in some cases; but after the membranes have given way, it must not be attempted.

7.—Labor may be rendered difficult, by a COMPOUND PRESENTATION, in which *one of the Extremities Presents with the Head*, as a hand, arm, or foot. While the fetus is within the uterus, its position is generally with the arms across the chest, and sometimes with one or both hands against each ear on the sides of the head; in these latter instances, when the membranes rupture and the liquor amnii is discharged, one or both hands, or even the whole arm, may descend with the head, and this is more apt to occur when the membranes have ruptured prematurely. These compound presentations are frequently occasioned by a large pelvis, and when such is the case, the delivery may be safely accomplished without assistance. But when the pelvis is small, the presence of the limb or hand increases the diameter of the head, and prevents its descent into the cavity; and if the uterine contractions are energetic, an arrest or impaction of the head may take place at the superior or inferior strait, and, perhaps, terminate fatally. When the foot, hand, or arm presents with the head, it must be pushed back with two or three fingers, during the absence of a pain, and held there until one or more subsequent pains causes the head to descend so low as to prevent any further falling of

the extremity, after which the labor must be left to the natural powers. In performing this operation, the accoucheur must be exceedingly careful not to draw the arm or hand down, nor to displace the head, as he might thereby convert the case into a shoulder presentation. In order to effect a successful manipulation of this kind, the whole hand will require to be introduced into the vagina, and partly through the os uteri. The operation should not be attempted until the os uteri is sufficiently dilated, and the expulsive pains have commenced; for if it be attempted in the first stage of labor, there will be more danger of displacing the head, and of producing an unnecessary degree of irritation of the cervix uteri, and the practitioner should be governed by this rule, even should the membranes have become prematurely ruptured. The upper extremities will generally be more easily returned, on account of their less volume, than the lower.

If the limb can not be returned, the practitioner must wait, as in other instances, until satisfied that the natural efforts are inadequate to terminate the labor, and unfavorable symptoms begin to manifest themselves, when it will become necessary to turn, or employ the forceps, or perform craniotomy, according to the peculiar circumstances of the case. It is impossible to lay down any special management of these cases: each one will have its own peculiarities, which, together with the tact and judgment of the attending accoucheur and his medical advisers, must determine the course to be pursued.

Sometimes both the hands and feet will present together, when it may become necessary to bring down the feet (and more especially when the feet present with the breech), and thus convert it into a footling case. In doing this, the practitioner can not be too careful in his examination, lest he occasion a descent of the arm or hand, or bring down a hand instead of a foot. Should there be a prolapse of the cord, in connection with these limb presentations, the case becomes still more serious, as far as the child is concerned; and the management should be in accordance with the rules hereafter given for this complication—hastening the delivery as soon as the pulsations are found to diminish.

CHAPTER XXXIII.

ON PRETERNATURAL LABOR—PELVIC PRESENTATIONS.

PRETERNATURAL LABOR, is where the head does not present, as, in shoulder or breech presentations; prolapsus of the umbilical cord, plurality of children, and monsters, are likewise included in this class. Females frequently have preternatural presentations in several successive labors, and it is impossible to assign any satisfactory cause for them. They can not be the results of violent shocks experienced during gestation, for they more frequently occur in cases where the period of pregnancy has passed free from any accidents. Dr. Denman, in 1795, remarked: "It seems doubtful, therefore, whether we ought not to exclude accidents as the common causes of these presentations, and search for the real cause from some more intricate circumstance; such as, the manner after which the ovum may pass out of the ovarium into the uterus; some peculiarity in the form of the cavity of the uterus or abdomen; in the quantity of the waters of the ovum at some certain time of pregnancy; or, perhaps, in the insertion of the funis into the abdomen of the child, which is not in all cases confined to one precise part, but admits of considerable variety." At the present day we are no further enlightened on this point than were the profession in his time. Some instances may, probably, be owing to uterine obliquity, or to peculiarity of the formation of the pelvis; thus, in three successive labors, I have delivered the same female by turning, each instance being a shoulder presentation in the second left cephalo-iliac position. This person, when young, had been employed to take care of children, and was in the habit of carrying them the greater part of the time on one hip; the crest of the left ilium was from an inch to an inch and a half higher than that of the right, when she stood erect. Whether this irregularity was owing to the manner in which she held the children during her youth, or whether it was the occasion of the shoulder presentations, I am not prepared to state: it is very difficult, in such obscure matters, to obtain, from one or two incidents connected with them, more than suggestions.

During gestation it is a very difficult, if not an impossible matter, for females to determine with certainty a preternatural position: they may suspect that such is the case, and may almost be positive of it, from certain circumstances not usual with them during this period; yet although their fears are occasionally confirmed when the labor comes on, they more frequently find themselves mistaken. Nor is it a more easy task for the accoucheur to ascertain, during pregnancy, a preternatural presentation, although some have professed an ability to decide by the sensation imparted to the hand, upon an abdominal exploration over the uterus at an advanced period; also, by the situation at which the pulsations of the fetal heart are heard. But I place no confidence in these methods, either singly or combined. It is not until the labor has actually commenced, that we can learn with positiveness the presentation of some other part than the head. When the membranes do not present the globular form usual in head presentations, but may be felt protruding into the vagina, having a peculiar, elongated, or conical-pointed shape, we may suspect a preternatural presentation, though this has been occasionally met with in vertex positions. "Sometimes, before the os uteri is much dilated, the membranes, filled with liquor amnii, pass into the upper part of the vagina, and form a considerable sac with a narrow neck."—(*Lee*.) A spontaneous and premature rupture of the membranes, is generally a diagnostic sign of preternatural presentation, in which case an internal examination should be made as soon as possible, in order to determine its character. If, previous to the rupture of the membranes, when the os uteri is somewhat dilated, we can not feel the presenting part, or, if felt, it is more movable, less smooth, globular, and resisting, than the head, a preternatural presentation may be suspected: such instances must be closely watched, and great care be had not to rupture the membranes, as an early discharge of the liquor amnii will render the operation of turning very difficult, or entirely impossible. Sometimes a foot, or a hand, or the umbilical cord, may be felt and clearly recognized through the membranes, but usually the presenting part can not be ascertained until these have ruptured.

In all labors, it is of great importance that the practitioner should ascertain, as early as possible, the nature of the presentation, in order that, where assistance is required, it may not be delayed until the golden opportunity for saving mother and child is lost. And, whenever he is positively satisfied that some other part than the head presents, he should inform the nurse, or friends of the patient, of the fact.

Presentations of the head are by far more common than those of any other part of the child, and have, therefore been arranged under the head of Natural Labors; other presentations being less frequently met with, will be considered under the present head of Preternatural Labors. A preternatural labor may terminate by the natural powers, but the labors are, as a general rule, slow and tedious, more painful to the mother, and more hazardous to the child than in head presentations; accidents are, likewise, more apt to take place, requiring artificial assistance.

PRESENTATIONS OF THE PELVIC EXTREMITIES, as of the breech, knees, or feet, belong to preternatural labors. In the majority of these cases the delivery may be safely effected by the natural powers, in consequence of which some eminent authors have included them among natural labors; but I consider the present arrangement as being more in accordance with the nature of the cases, and better adapted to facilitate an acquaintance with them. From the statistics heretofore cited, which are the recorded statements of British, French and German accoucheurs, it will be observed that the danger to the child is much greater in pelvic presentations than in those of the head, and that the cases in which the inferior extremities present are more hazardous than in true breech deliveries.

The principal danger in these breech labors is to the child; the soft passages are not so thoroughly dilated by the body as by the head, because the breech, even with the legs turned up, does not present so great a bulk in circumference or diameters as the head, and consequently, when the head is in the pelvic cavity, it can not descend until the parts become still further distended and better adapted for its advance. This renders the delivery of the head slow and tedious, during which the cord may be exposed to a pressure resulting in fetal asphyxia; or the same result may ensue from detachment of the placenta, before the head has passed the outlet; or by pressure upon the placenta when situated between the fetal head and the uterine walls; in either of which instances the utero-placental circulation is suspended. The first (compression of the cord) is a more common cause of the child's death in footling presentations; the latter, in those of the breech. When the thighs are not flexed upon the abdomen, the child being delivered by the feet or knees, the head will advance more slowly, in consequence of the greater resistance offered to it, than where the limbs are turned up, and the greater delay and longer-continued pressure upon the cord renders this species of pelvic deliveries more fatal to the child.

The danger to the mother in these cases is owing entirely to a delay in the second stage of labor beyond a certain period, to injuries of the soft parts from compression, or improper efforts to facilitate the child's expulsion, and to narrowness or deformity of the pelvis.

DIAGNOSIS.—Previous to labor a pelvic presentation may sometimes be ascertained, especially among women whose abdominal walls are thin, soft, and flaccid, by feeling the fetal head in the upper part of the uterus, inclined either toward the right or left side; if auscultation be resorted to, the pulsation of the fetal heart may be heard in the upper portion of the abdomen, either above or on a level with the umbilicus; if a vaginal exploration be made it will be found difficult to reach or distinguish the presenting part, though sometimes, instead of the hard, globular tumor felt in head presentations, a small tumor, the foot, may be felt, and *ballotted*.

But the most certain method of diagnosis is during labor, in the absence of pain, when the presenting part can be felt. The breech may be known from the head by its soft and fleshy feel, and by the absence of sutures and fontanelles; it is not so round or so hard as the head. Upon some part of the anterior surface will be felt the hard, resisting trochanter; passing the finger carefully around, the tuberosities of the ischia may be detected, also the fissure between the nates; at the bottom of this fissure are found the most important signs, as the sacrum, coccyx, anus, and external genital organs; and the anus may be detected from the mouth, by the difficulty, if not impossibility, of introducing the finger into it. The presence of the somewhat sharp-pointed, movable coccyx not only assists us in determining the character of the presentation, but also that of the position, because its point or apex is always directed toward the side of the maternal pelvis corresponding with the child's abdomen. The presence of the meconium, which has been noticed by some writers as a diagnostic sign, is really of little value, as it is frequently met with in head presentations, and also occurs as a sign of the child's death.

Having become positively certain that the breech presents, it should be named to the husband, nurse, or some relative, but great care must be taken to conceal it from the patient, lest it impart a shock to her mind which may suspend or retard the labor for several hours. The communication should be made to the husband in a separate room, and all the dangers to which the child is exposed, fully made known, so that in case it be still-born, the skill or ability of the medical attendant may not be called into question. Should the sex of the

child have been ascertained during the examination, it must not be made known to any one, lest it reach the patient's ears, and effect an unfavorable influence over the progress of the labor, by the disappointment it might occasion should it be different from the one desired.

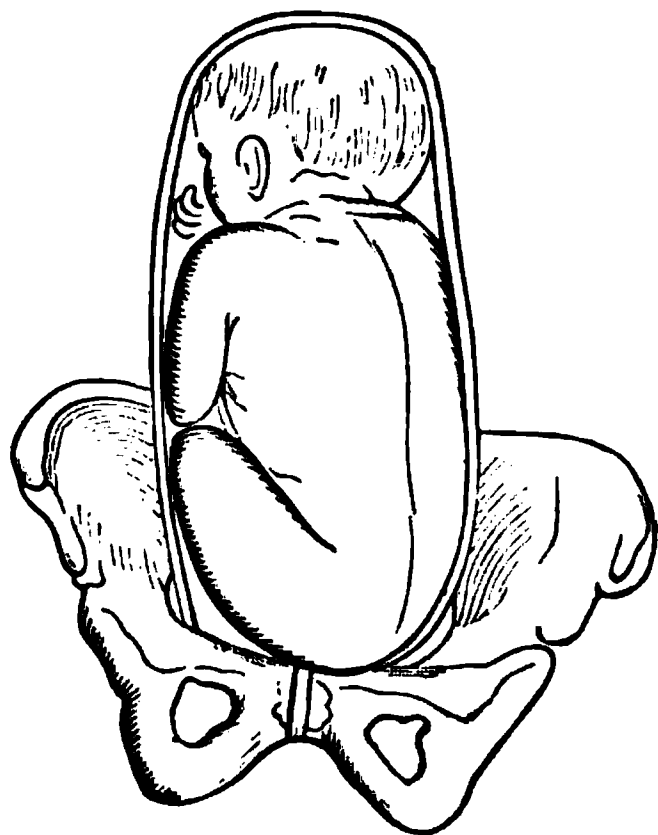
By reference to a preceding page it will be seen that four positions are given, in any one of which the breech may present; and which positions are ascertained by the coccyx, ischiatic tuberosities, genitals, etc., and named according to the situation of the back or sacrum of the child.

1.—MECHANISM OF FIRST LEFT SACRO-ILIAC POSITION.

In this position the sacrum of the fetus faces the maternal left ilium anteriorly, while the hips or bi-trochanteric diameter are parallel with the right oblique diameter of the superior strait [or, for a time with its antero-posterior or transverse diameter]; the abdomen, and posterior part of the fetal thighs flexed upward, are toward the right ilium posteriorly, its left side is in front, and its right side to the back of the mother; the head is slightly flexed on the chest, and inclined to the right and posteriorly. But in all the positions named, as soon as the bag of waters rupture and all the liquor amnii escapes, the uterus comes directly in contact with the fetus, perfecting the flexion of the head, and at the same time maintaining its limbs in close contact with its body.

As soon as the membranes rupture, a large amount of the liquor amnii escapes, and the presenting part, which was previously high up, engages in the brim, and its position can now readily be ascertained. The hips usually engage in the direction of the right oblique pelvic diameter, occasionally of the transverse. (*Fig. 59.*) As the uterine contractions continue, the nates generally descend, with the hips in the right oblique diameter, into the pelvic cavity until they arrive at the inferior strait, the left or anterior nates being the lowest. [This oblique diameter is soon taken by the hips, should they be at first situated transversely.] At this point a slight or partial rotation sometimes, but not always,

FIG. 59.



takes place, and the child's left hip is carried slightly to the left, and

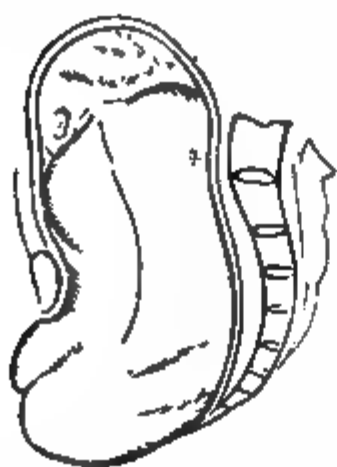
FIG. 60.

somewhat toward the pubis, while its right similarly rotates to the right toward the hollow of the sacrum. (*Fig. 60.*) The left hip appears first at the vulva, under the pubic arch, the bi-trochanteric diameter being nearly if not quite in the direction of the right oblique diameter; this hip maintains its position there, while the right hip is made to gradually traverse the hollow of the sacrum, and inner perineal surface, describing an arc of a circle around the left hip as a center. In some cases the left hip, during this motion of the right, ascends behind

the pubic symphysis.

While the right hip is passing over the posterior wall of the pelvis, the body of the child becomes curved laterally on its anterior side, so

FIG. 61.



as to accommodate itself to the curvature of the pelvic cavity. (*Fig. 61.*) This lateral curvature continues until the body is expelled; though as the parts are disengaged they recover their original position.

As the right hip advances toward the posterior commissure, the bis-iliac diameter of the fetus corresponds with the pelvic anteroposterior diameter, and the process of restitution takes place after the delivery of the pelvis, placing it in its original diagonal position; though, in most cases, this oblique

position is retained throughout the delivery. The hips having been delivered, the fetal breast engages in the excavation, and as the body descends, the inferior extremities fall out. The shoulders are commonly in the same oblique pelvic diameter as the hips, when they arrive at the inferior strait, and are born in a similar manner, the right or posterior shoulder being generally delivered first. It has been advanced, heretofore, by many writers, that when the hips or shoulders reached the floor of the pelvis, that rotation, somewhat like that of the head, occurred, placing one hip or shoulder under the pubic arch and the other in the hollow of the sacrum. But that

careful observer, M. Nægèle denies this in something like the following language: "In its (the breech) farther advance into the pelvis, it is always found in an oblique direction, the hip directed forwards standing lowest. In this oblique position, with reference to its transverse and perpendicular diameters, it is forced through the inlet, the cavity, and the outlet of the pelvis; and in general none of these rotations occur, erroneously described in many manuals and compendia as appertaining to this species of labors."

The arms are usually applied closely to the thorax, and are thus delivered; but it sometimes happens, that one or both of them get up along the sides of the head, rendering the delivery of the head very difficult, and requiring artificial interference. This may be occasioned by the smallness of the pelvis, or the unusual size of the child; but it more commonly arises from an imprudent traction made by the accoucheur on the pelvic extremity, in order to facilitate the delivery, and which improper interference may still further increase the difficulty of the labor, by effecting an extension of the head. In ordinary instances, where one arm has been thrown up by the side of the head, it will most commonly be the one behind the pubic symphysis.

While the shoulders are being disengaged, the head, usually well flexed upon the thorax, has entered the superior strait in the direction of its left oblique diameter, the forehead being toward the right sacro-iliac symphysis, and the occiput toward the left acetabulum, which flexion and diagonal position it retains until it has reached the inferior strait. At this strait, the relation of the pelvic diameters with those of the fetal head will vary according to the degree of flexion. If the flexion be moderate, the occipito-frontal diameter will be parallel to the left oblique of the strait, and the bi-parietal to the right oblique, while the trachelo-bregmatic diameter will very nearly correspond with the axis of the inferior strait. But if there be a greater degree of flexion, the sub-occipito-bregmatic will correspond with the pelvic left oblique diameter, and the axis of the lower strait will very nearly pass in the direction of the occipito-mental diameter.

Upon arriving at the inferior strait, the head undergoes the movement of rotation, by which the face is carried into the hollow of the sacrum, the occiput behind the symphysis pubis, and the neck under it; the sub-occipito-bregmatic diameter is placed nearly in correspondence with the pelvic antero-posterior. At this period, the head is nearly, or altogether in the vagina, and consequently the contractions of the uterus exert but little or no expulsive influence upon it; the further progress of the head is, therefore, to be effected by the con-

tractions of the abdominal muscles. As the neck is situated firmly against the pubic arch, preventing the descent of the occiput, the contractions will occasion the head to become more and more flexed upon the chest, and while this motion is taking place, the chin, face, forehead, and posterior fontanelle, traverse the internal face of the sacrum and perineum, and successively appear in front of the posterior commissure of the vulva, while the occiput is the last delivered.

2.—MECHANISM OF FIRST RIGHT SACRO-ILIAC POSITION.

In this position the sacrum of the fetus faces the maternal right ilium anteriorly, while the bi-trochanteric diameter is parallel with the left oblique diameter of the superior strait [or, for a time, with its antero-posterior or transverse diameter]; the abdomen, and posterior part of the fetal thighs flexed upward, are toward the left ilium posteriorly, its right side is in front, and its left side to the mother's back; the head is flexed and inclined to the left and posteriorly.

The mechanism in this position is precisely similar to the one just described, with the exception of an inversion of the relations of the parts. The right hip is the one placed at or near the pubic arch, while the left traverses the posterior wall of the pelvis. The right shoulder assumes the same oblique diameter as the hips had previously, and the head engages in the cavity with the occiput toward the right acetabulum, and the forehead toward the left sacro-iliac symphysis.

3.—MECHANISM OF SECOND LEFT SACRO-ILIAC POSITION.

In this position the sacrum of the fetus faces the maternal left ilium posteriorly, while the bi-trochanteric diameter is in the direction of the left oblique diameter of the superior strait; the abdomen and posterior part of the thighs flexed upwardly, are toward the right ilium anteriorly, its left side is in front, and its right side to the mother's back; the head is flexed and inclined to the right and anteriorly. The left hip presents, and is the lowest during the whole of the expulsion, and the whole of the body is expelled, as in the previous instances, with the exception of the abdomen looking forward to the right. The left hip is the one placed at or near the pubic arch, while the right traverses the posterior wall of the pelvis. The left shoulder assumes the same oblique diameter as the hips had previously, and the head engages in the cavity with the occiput toward the left sacro-iliac symphysis, and the forehead toward the right acetabulum. As with an occipito-posterior position, when the head is in the pelvic cavity near the floor of the pelvis, extensive rotation occurs from left to right,

which places the occiput under the pubic arch, and the face in the hollow of the sacrum. The whole body of the child may be observed to partake in this rotation, which brings the back of the child to the front, and its abdomen to the back. The head is then born as in the first sacro-iliac positions. It may be observed here, that in these second sacro-iliac positions, it is better, in order to avoid difficulty when the head reaches the floor of the pelvis, to aid in effecting the extensive rotation, as hereafter explained in the treatment of breech cases, provided it does not take place naturally.

4.—MECHANISM OF SECOND RIGHT SACRO-ILIAC POSITION.

In this position the sacrum of the fetus faces the maternal right ilium posteriorly, while the bi-trochanteric diameter is in the direction of the right oblique diameter of the pelvic brim; the abdomen, and posterior part of the thighs flexed upwardly, are toward the left ilium anteriorly, its right side is in front, and its left side to the mother's back; the head is flexed and inclined to the left and anteriorly. The right hip presents, and is the most dependent part. The mechanism of this position is the converse of the preceding, the occiput engaging toward the right sacro-iliac symphysis, and the forehead toward the left acetabulum.

TREATMENT OF BREECH PRESENTATIONS.

In all presentations of the pelvic extremity, the cases should be left to the natural powers, unless accidents occur imperatively calling for assistance, and this point can not be too strongly urged upon the student. Great care must be taken to preserve the first stage of the labor as thorough as possible, that the os uteri may become well dilated, and not only should the accoucheur be extremely careful not to rupture the bag of waters, but he should also prevent any efforts on the part of the woman that may tend to this end; she should be kept quiet and urged to move about as little as possible. The mere fact of a child being born "*doubled up*," as in a breech presentation, does not necessarily presuppose interference, especially when we call to mind the diameters of the parts. The largest diameters of the fetal breech, as the bi-trochanteric and bis-iliac, are smaller than the bi-parietal diameter of the head, or the bis-acromial diameter. When a presentation of this kind is met with, no attempts should be made to bring down the feet and inferior extremities, unless there be proper cause for so doing; to do otherwise is bad, meddlesome practice. When the breech descends with the limbs flexed upon the abdomen,

the labor proceeds slowly, sometimes lasting for hours, in consequence of the yielding character of the presenting parts, which, not being firm and resisting, like the head, give way, to a certain extent, during each pain, and thus require a longer time to render the soft parts of the mother sufficiently yielding. But this protractedness in the delivery of the fetal pelvis, is rather to the child's advantage; for the maternal parts become so thoroughly dilated and yielding thereby, that the head passes without any difficulty, a few efforts of the patient being sufficient, in ordinary instances, to expel it shortly after the delivery of the shoulders. But, if the feet be imprudently brought down by an unskillful accoucheur, the smaller bulk offered to the soft tissues of the maternal generative parts, will not so completely dilate and adapt them to the easy passage of the head, which in consequence may be so long delayed in its expulsion as to occasion the death of the child.

Neither is it proper to employ any extracting force, for the purpose of facilitating delivery, as the child may be destroyed by a severe and injurious extension of the neck; it being borne in mind that the neck of the child before birth is capable of sustaining no more extractive force than afterward, and any great amount of traction must injure the spinal cord; beside, the arms not being maintained in their position by the contractions of the uterus, become arrested, and do not simultaneously participate in the descent accomplished artificially by traction; hence, as the head advances by the traction, they become placed on its sides, and greatly interfere with its expulsion during the last period of the labor. When the contractions of the uterus expel the child, the arms are born in the position originally assumed by them; but if traction be made, its influence is exerted only on the body, and there is invariably a tendency of the arms to rise along the sides of the head, because the pressure of the uterine fundus is then no longer exerted upon them to keep them in place. Consequently, it is bad practice in ordinary cases, to bring down the feet, as well as to attempt to hasten labor by making artificial traction.

In these preternatural cases, the physician should be more attentive to the progress of labor than in natural cases, being careful, however, not to alarm his patient by an unnecessary display of over-anxiety, or officiousness, nor to make any injudicious attempts to advance its progress during the early stage. During the escape of the breech from the vulva, the perineum becomes greatly distended, and it should be steadily supported in order to prevent the too rapid advance

of the pelvic extremity, as well as to impart a motion to it in the direction of the inferior part of the pelvic axis, and without which movement much delay would be occasioned. Dr. Collins remarks: "The most critical part of the delivery, should much delay take place, is during the passage of the head, which pressing continuously on the funis speedily deprives the child of life. To guard against this, therefore, the breech should be permitted to pass slowly and unassisted, so as gradually and perfectly to dilate the soft parts, thereby greatly facilitating the completion of the labor." When the contractions of the uterus are sufficient to expel the fetus, however slowly, no interference whatever is required; *it is only when the breech has so far advanced externally as to permit the cord to be reached, that any aid will be needed.* The cord must be drawn down a little, in order to prevent it from being broken off, as well as to prevent its vessels from being stretched. The umbilical arteries of the cord run in a tortuous manner around the vein, and consequently any stretching of the cord would, by diminishing their caliber, as effectually check the circulation, as from direct pressure of the head while in the pelvis; hence, by keeping a loop of the funis slack, we prevent any danger to the child from tension of the cord during the advance of the body. After the cord has been placed within reach, the necessity for interference can always be determined by the character of its pulsations; if these be strong, haste is not required; if they become feeble, irregular, or intermittent, assistance must not be delayed, and the body of the child may be brought down during a pain; if they have ceased, an indication of the child's death, the case should be left to nature. A soft napkin should always be wrapped around the child's body, as soon as the feet have been delivered, which will protect its surface from being injured, as well as enable the physician to hold it more firmly when performing any manipulation which may be required.

The passage of the shoulders through the external parts must be carefully attended to, and if they do not present favorably at the outlet, rotation should be made, to bring the proper one under, or nearly under, the pubic arch, and the other into the cavity of the sacrum. If the arms remain by the side of the child, there will be no delay in the expulsion of the shoulder, but if they have become elevated, the advance of the shoulders and head will be very much, if not entirely, retarded. To obviate this, one or two fingers are to be passed along the arm, as near as possible to the elbow, when the elbow must be drawn downward and forward, across the face and chest, until

it arrives at the outlet; one arm having been liberated, the other may be drawn down with but little difficulty. The easiest way of effecting the descent of the arms, is to begin with the one nearest to the perineum, and to draw downward, and anteriorly over the face and chest of the child; if the force be directly downward, or toward the back of the child, or be made with suddenness or violence, the arm may be broken or dislocated, and the soft parts of the mother be considerably injured. The blunt hook has been advised in these cases, but I see no necessity for it, as the arms may always be reached by the fingers.

The shoulders and arms having escaped, the situation of the head must be ascertained by an examination. For this is the critical period, in which the child is subject to great peril from the following causes, and in which its life or death is determined in a few seconds:—1, compression of the cord; 2, the uterus being, as it were, in an empty state, diminishes in size, which interferes with and prevents a full flow of blood to and from the placenta, thereby lessening the aeration of the fetal blood to a greater or lesser extent; 3, the reduction in size of the uterus is followed by a detachment of the placenta from the uterine wall; 4, the head now being nearly or entirely out of the uterus, is no longer under the influence of its expulsive action—its *vis à tergo*—and unless this lost force is compensated, the child will certainly be lost. If no improper interference has been attempted, all these dangers may generally be avoided by the straining or bearing-down efforts of the diaphragm, abdominal muscles, etc.

During the progress of the labor the accoucheur must so manage, if required, as may occasionally be the case in the *second* sacro-iliac positions, that when the head is in the pelvis, the face will be directed toward the hollow of the sacrum. When this is effected, either naturally or artificially, he will elevate the child's body toward the maternal abdomen, so as to bring the long diameter (mento-occipital) of its head in correspondence with the axis of the inferior strait; and should the chin have departed from the breast, he will introduce two fingers and place them upon the child's upper jaw, and by gentle pressure depress the chin upon the breast, thus facilitating the expulsion of the head by presenting a shorter diameter of the head to the inferior strait; and, if necessary, the flexion may be still farther facilitated by passing a finger or two behind the symphysis pubis, for the purpose of pushing the occiput somewhat upwardly at the same time that the chin is being depressed. At this time, the head, being freed from the uterus, is not influenced by its contractions, and the auxiliary aid of the abdominal

muscles, etc., will be required to terminate the delivery; consequently, instead of waiting for a pain, the patient should be urged to bear down, to use her utmost effort in bearing down, that the head may be expelled, for any delay will endanger the life of the child, from the continued pressure of the head upon the cord, etc. Assistance may likewise be given, by applying gentle extractive force to the shoulders in the direction of the axis of the inferior strait, bearing in mind, however, that an excessive amount of such force, will seriously injure the child's neck. But no force whatever must be employed that would so far stretch the neck as, in the least, to affect the upper part of the spinal cord. Should a delay in the passage of the head occur, the child may be frequently saved, by introducing a finger into its mouth to remove any mucus which may be there, and then "pass two fingers upward until they reach the two maxillary bones, and cover the nose; by doing this, the backs of the fingers, pressing the perineum backward, serve to keep an open communication with the air, and the child can breathe very well until the expulsive efforts come on."—(*Meigs*.) [A flat, flexible tube introduced into the mouth of the child, has also been advised, for the same purpose.] This author also recommends the forceps to be within reach in all pelvic presentations, feeling well assured that he has saved several lives which would have been lost but for this precaution; I am satisfied that this course is not only wise and prudent, but that a resort to the forceps in all cases of delay in the delivery of the head, in which the pulsations of the cord are becoming feeble, will result in benefit to both the child and mother. In these cases, the practitioner must act promptly, for a few moments' delay may prove fatal to the child. It should, however, be stated here, that the forceps will not be so frequently required in those cases in which the head is at the superior strait, and in which the bearing-down efforts of the woman are insufficient, as has been generally represented. If the accoucheur or an assistant, will make the bearing-down efforts, by placing his hands upon the inferior portion of the abdomen so as to make strong pressure upon the fetal head, he can supply the required degree of a vis à tergo, and thus obviate the necessity for the application of forceps. The forceps, I consider useful in breech presentations, only after the head has passed through the brim into the pelvic cavity, the expulsive efforts being insufficient for its delivery. If, however, the child be dead, as known by the cessation of pulsation in the cord, and the head be very large, or some obstacle presents rendering it very difficult to extract with the forceps, the perforator may be introduced behind one or both ears, for the pur-

pose of lessening the size of the head, and thus terminating the labor. The head being born, the rest of the labor will be managed as in natural labors..

When the uterine contractions become inefficient, previous to the expulsion of the breech, or when, from any cause, a quick delivery is demanded, one or two fingers may be passed up and hooked into the groin, and steady and gentle traction be made, in the proper direction, during the presence of a pain; the pains may, likewise, be rendered more efficient by compressing or manipulating the uterine fundus through the abdominal walls; by the internal administration of Sulphate of Quinia; or the administration of Macrotys may stimulate the uterus to more powerful contraction; the small dose may be repeated every half-hour until the desired result is produced. Sometimes a few doses of the Parturient Balm may be administered, but on no account is Ergot to be given in a case of pelvic presentation. For the purpose of extracting the breech, the fillet and blunt hook have been recommended—these may sometimes be useful, but great care is required in using them, lest the thighs of the child be fractured. And it must never be lost sight of, that whenever extracting force is employed, it should always be made in the direction of the axis of the pelvic cavity, according to the part at which resistance is offered, whether the force be made with the hand or fingers, or with an instrument.

The most difficult cases of breech deliveries are those in which the sacrum of the child is directed posteriorly, or toward the maternal sacrum, and during the descent, rotation has not been effected, as may happen in the second sacro-iliac positions; in consequence, when the head reaches the inferior strait, the face of the child will be to the pubis, and its occiput to the sacrum. This will occasion considerable difficulty in the delivery of the head, beside being a very dangerous situation for the child. A complete rotation of the child's body, so as to reverse the positions, and bring the face eventually to the hollow of the sacrum, must be produced, either spontaneously, or by the management of the accoucheur. In these second sacro-iliac positions, when the breech is low in the pelvis, and not yet delivered, and the desired rotation has not taken place, two or three fingers may be introduced for the purpose of forcing, by steady and continuous pressure, that hip which is situated the most anteriorly, toward the pubic symphysis; and the delivery of the hips being achieved in this position, they may be enveloped in a soft napkin, and as the pains expel the body, the accoucheur will gradually continue the rotation in such a

manner that the face will be in the desired position at the time it reaches the lower part of the pelvic cavity. And in effecting this change, should the pains urge the body too rapidly onward, he must, by counter-pressure, prevent its too hasty exit, until the rotation is satisfactorily accomplished.

Sometimes the body of the child will be held by the womb so forcibly, during a pain, that the rotation can not be performed; the practitioner should then operate during the absence of pain, first pushing the child's body upward as far as possible, and then giving to it a compound movement, by drawing it downward and at the same time rotating it. By this manipulation, the arms are prevented from passing up by the sides of the head.

Should the head, however, have reached the inferior strait with the face to the pubis, the practitioner will cause the female to lie on her back, her hips being brought over the edge of the bed, and the feet supported on chairs by two assistants. As soon as the shoulders are delivered, an assistant will carry the body of the child backward, while the accoucheur will press the perineum back, with one hand, to prevent its forcing the throat against the pubis, and with the other he will bring down the chin, either by introducing two fingers into the mouth, or better, by placing them upon the upper jaw. The chin having been thus depressed, the woman must be urged to bear down forcibly, in order to facilitate the expulsion of the head. Should this method fail, the forceps will probably be required, or perhaps the perforator.

Notwithstanding the rules just laid down for bringing the occiput under the pubic arch, it must always be borne in mind, that, whether the position be a first or second sacro-iliac, if there has been no improper interference with the labor, the rotation of the head, in the pelvic cavity, will almost always effect the desired results, naturally,—bringing the occiput under the pubic arch without any artificial assistance. “It appears to be a law in nates presentations, that whatever may be the direction of the child (first or second sacro-iliac) at the beginning of labor, it will always, if not interfered with, be found with its anterior surface turned toward one or other of the sacro-iliac symphyses when the thorax or the shoulders are beginning to pass through the outlet of the pelvis.” (*Rigby*.)—Relative to the sacrum of the child being directed toward the maternal abdomen, another writer observes: “It is very desirable the child should be delivered in this position, as it renders the getting away of the head much less difficult; yet where there has been no interference by the attendant in the previous part of the labor, he will rarely find it necessary to subse-

quently alter the child's position, the breech naturally making the turn, above alluded to, in its passage." (*Collins.*)

I have stated heretofore, that it is bad practice, in breech presentations, to bring down the feet; still, there may be instances where this will be demanded, and where it will become necessary, also to employ some forcible traction, in order to expedite delivery. Thus, in cases where the breech is large and the pelvis narrow, it may be almost impossible for delivery to be effected, without some interference of this kind; accidents may also occur, at the *commencement of labor*, which, by jeopardizing the life of the mother, require a hastening of the labor, as in convulsions, hemorrhage, etc. But should these occur while the os uteri is undilated, temporizing and palliative measures only can be employed, and no attempts whatever should be made to introduce the hand within the uterus for the purpose of bringing down the feet.

Should these accidents occur when *the breech is low in the pelvis but still within the uterus*, we must be guided by the circumstances. If the os uteri be rigid, no attempts to introduce the hand must be made until the rigidity is overcome: if it be dilatable and in proper condition the hand may be introduced, whether the membranes be ruptured or not, and the feet brought down.

If interference is demanded after *the breech has been expelled from the uterus*, the feet must not be brought down, unless the pelvis be large, or the breech be small, and unless the pains have ceased to be efficient. In this case, if the breech be very low in the pelvis, a finger may be passed above one or both groins, and during the presence of pain, traction may be made in the direction of the pelvic axis. If the breech can not be delivered by this means, the fillet may be employed, and if this can not be applied, the blunt hook must be resorted to.

As remarked in a previous chapter, knee and feet presentations are mere deviations from the breech, the labors being more painful and difficult, with greater risk to the child, but requiring a similar management. When the KNEE presents, it may be mistaken for an elbow, but may be distinguished from it by the rounded patella with its flat surface, and which is more or less movable on the condyles of the thigh bone; the olecranon of the elbow is pointed and sharp—not flat, like the patella, and is not movable. Nægèle observes that the “knee is thicker, has two prominences, and a depression between them, while the elbow is thinner, and presents to the feel, between the two prominences, a projection (*olecranon*), in which it seems to end.”

The shoulder has but one prominence or tuberosity, "from which the bony ridges of the clavicle and scapular spine may be traced."

In knee presentations it is always advisable to convert them into footling cases, which may be effected by pushing the fetus upward during the absence of pain, so that sufficient space may be gained to bring down the feet.

A FOOT may be determined from a hand, by its rounded instep, its prominent heel, the toes being all in one line, and no one of the digits being an opponent to the others: the hand has no rounded instep, no prominent heel, the digits are not all in one line, there is a flattened palm, the fingers longer than the toes, not all of the same length, and the thumb opposed to the fingers. The foot is also longer than the hand, and its sole flatter, and the presence of the heel, with the ankle-bone on each side, will distinguish it from the hand and wrist.

When one foot only descends, we should determine whether it be the right or left; but it is not always so easy to detect the position of the child by the foot, at least, not until the hips have engaged in the superior strait. But when both feet come down, crossing each other, the toes will lie in the direction of the child's abdomen or anterior surface. In knee or footling cases, as with those of the nates, nothing can be done by the attendant, except to patiently observe nature's operations, and to quickly detect any departure from their normal course. The labor will be slower and more painful to the mother than if the nates had presented, but its management will be exactly the same, unless, as ascertained from the diminution of the pulsations in the cord, or otherwise, the child's life becomes endangered, when the delivery must be expedited by the means already referred to.

In cases of breech presentation, various means should be in readiness, as a warm bath, etc., to resuscitate the child, should animation be suspended; its limbs and genitals should also be carefully examined before leaving it; and if they present appearances of injury, a proper dressing should be applied, in accordance with the nature of the case. If the child be born in a state of defective vitality, some of the measures looking to resuscitation may be pursued, according to circumstances.

Rigidity of the os uteri, pelvic tumors or deformities, and other circumstances which may also be present in vertex presentations, occasioning difficult labor, must be treated as directed under the head of Difficult Labor.

CHAPTER XXXIV.

OF PRETERNATURAL LABOR—SHOULDER PRESENTATIONS.

It is as difficult to assign a sufficient explanation of the cause of presentations of the superior extremities as of those of the pelvic. They have been attributed to irregular distension of the uterus, to uterine obliquity, to irregular contractions at an early period of labor, etc., and they may have existed primarily. Dr. Rigby remarks: "We may, therefore, state that the causes of arm or shoulder presentation are of two kinds, viz.: when the uterus has been distended by an unusual quantity of liquor amnii, or when, from a faulty condition of the early pains of labor, its form has been altered, and with it the position of the child." Dr. William Leishman, in considering the causes of transverse presentations, calls attention to the fact that "Any fault or deformity in the structure of the pelvic brim, which may act by preventing the descent of the head into the cavity, may turn aside, toward the iliac fossa, that extremity of the fetal ovoid, when the shoulder may slip down and take its place. The unfortunate tendency to a recurrence of this presentation in women who have already had a child or children, presenting by the superior extremity, would almost seem to indicate that some anatomical peculiarity of the parts may be the cause; and it was this which led Wigand to suppose that the form of the uterine cavity was the determining cause, and that, in those cases in which cross-birth occurred, the transverse diameter of the uterus was in the first instance augmented, the long diameter of the cavity being thus relatively diminished." Still, these "cross-births," as they are often called, are involved in much obscurity; there appears to be a natural tendency to them with some women (as above stated), who have them at every labor.

Previous to the commencement of labor, there are no positive signs by which we can determine the presentation of a shoulder, or of any part of the body; and no dependence can be placed in an unusual figure of the uterus, as ascertained by applying the hand over the abdomen. A transverse presentation of the fetus may be suspected when the os uteri dilates slowly, when the membranes protrude into the vagina in an elongated form, when the presenting part is beyond

the reach of the finger, and when, after the rupture of the membranes, the pains cease for several hours. A vaginal examination will determine the correctness of our suspicions, as well as inform us of the position; and both of these points should be satisfactorily ascertained before any interference is attempted by the practitioner.

I have already remarked, in a preceding chapter, that there are two positions for each shoulder, viz.: FIRST LEFT CEPHALO-ILIAC, and FIRST RIGHT CEPHALO-ILIAC of the RIGHT SHOULDER, and SECOND LEFT CEPHALO-ILIAC, and SECOND RIGHT CEPHALO-ILIAC of the LEFT SHOULDER; and to which the reader is referred for an explanation of the situation of the child in these several positions.

DIAGNOSIS.—Previous to the rupture of the membranes, the presenting part is commonly elevated beyond the reach of the practitioner's finger, which alone should lead us to suspect a preternatural presentation; but it may always be felt after they have given way; and then a careful examination should be made, that no doubts may exist with regard to the nature of the case. This should be satisfactorily accomplished, in all instances, immediately after the membranes have ruptured, and if necessary, a part of the hand, or even the whole of it, should be introduced into the vagina, for the purpose of making a correct diagnosis. Should the presenting part be an elbow or hand, it may be felt offering at the mouth of the uterus *before* the rupture of the membranes; and sometimes, after a hand has been clearly detected at the os uteri, it has subsequently become withdrawn, and the vertex found presenting. The *shoulder* may be known from the head by its being less bulky, less firm and resisting, and by the absence of sutures and fontanelles; from the breech, by the absence of the anus and parts of generation, and by being not so large and less fleshy. The finger, on coming in contact with it, first detects the projecting acromion, in front of which will be felt the clavicle, below which the ribs and intercostal spaces will be readily made out; then carrying the finger behind the acromial process, the hard, spinous process of the scapula will be detected, the surface inferior to it will be found plane and smooth, terminating below in the acute inferior angle of the scapula, which is movable and will permit the finger to pass under it. The arm may also be felt and distinguished from the thigh by its size, and sometimes the depression in the neck can be recognized. Great care must be taken in the examination, especially when a hand or arm is felt, to determine whether it is due to a transverse presenta-

tion, or is the troublesome complication of a vertex presentation; and to positively ascertain these matters it will become necessary to introduce the fingers or the hand through the os uteri. It is likewise proper to learn whether the shoulder has engaged in the brim. In these cases the accoucheur should not leave his patient until he has clearly satisfied himself both of the presentation and the position.

Having ascertained the case to be a shoulder presentation, the next and most important point is to determine which shoulder presents, and its position. If this can not be ascertained at an early stage of the labor, it always can in time to be remedied, and that is, when the dilatation will admit; this may be effected by ascertaining where the fetal head lies, and the situation of its back. The side to which the head is directed may be known by the axilla, which must always look in an opposite direction to that of the head; thus, if the axillary space looks toward the left ilium of the mother, the fetal head will be to her right ilium, and *vice versa*. The direction of the back may be known by the scapula and vertebræ behind, and the clavicle, ribs, and intercostal spaces before. Should there be the least doubt relative to these points, the practitioner should not hesitate to bring down an arm in order to assist him in his diagnosis, as it will occasion no difficulty in the operation of turning; but in effecting it great care should be taken not to make the slightest traction upon the fetus.

When the *elbow* presents, it may be recognized by three bony prominences, viz.: the olecranon and the two condyles, and by the bend of the elbow occasioned by the flexion of the fore-arm upon the arm. The position of the fetal head may also be known readily, being always toward the side opposite to that in which the elbow is directed; and the fore-arm usually rests upon the anterior of the child's body, as just remarked above. I repeat, should there be the least doubt as to the position, or the presentation, and provided the membranes have ruptured, the arm may be carefully brought down, making no traction whatever upon the fetus. To distinguish a knee from an elbow has already been explained in the preceding chapter.

Sometimes a *hand* will hang down in the vagina, or even out at the vulva, and be mistaken for a foot. If the young accoucheur will accustom himself to feel and handle the various parts of a newly-born child, as the feet, knees, hands, elbow, shoulders, etc., he will acquire a ready tact in diagnosticating, which will prove greatly advantageous. We may learn which shoulder presents by the hand. If the palmar surface be found directed toward the pubic symphysis, the thumb

turning to the right side of the maternal pelvis, it is the right hand, and consequently a presentation of the right shoulder; if the thumb turn to the left side, it is the left hand, and left shoulder presentation. If the dorsal surface or back of the hand be directed in front, the thumb being toward the right side of the pelvis, it indicates the presence of the left hand and shoulder; if the thumb be toward the left side, it is the right hand and shoulder presenting. The head is always in the direction of the thumb; thus, if the thumb be toward the left side, the head will be in the left iliac fossa, and *vice versa*; if the palmar surface of the hand be in front, the child's face will be looking towards its mother's abdomen; if the dorsal surface be in front, the back of the child will be toward the maternal abdomen.

Having ascertained that the presentation is of the shoulder, the practitioner should immediately inform the husband or friends that it is a "cross-birth," and explain to them, without any reserve, the necessity for interference, and the hazards to the child as well as to the mother. The earlier assistance can be given after the membranes have ruptured, or after the os uteri has fully dilated, the better will it be for all the parties concerned. Delay, after these conditions, compromises the patient's life, as each pain not only augments in severity, but forces the shoulder more and more tightly into the pelvis, so that the woman becomes exposed to the consequences of exhaustion, or rupture of the uterus, while the child is lost from the constant pressure. Whenever it is possible, council should be had, that the friends may be thoroughly satisfied, and also that no subsequent censure may be attached to the attendant, should serious consequences result. The patient should, likewise, be informed that labor can not proceed without artificial aid, and the reason made known to her; and this should be done in a kind and gentle manner, carefully avoiding any discouraging word, look, or action. But this communication should not be made to her until we are about to commence attempting the version.

TREATMENT OF SHOULDER PRESENTATIONS.

When a shoulder presentation is suspected or ascertained previous to the rupture of the membranes, and before the os uteri is sufficiently dilated, every means should be used to preserve the membranes entire; examinations should be made with care, and the female should be kept in a horizontal position. No attempts whatever should be made to force the hand into the uterus until it is dilated or dilatable, and even then not until the position is satisfactorily determined. In

the meantime, the rectum should be evacuated by the administration of a mild, emollient enema, if necessary, and the bladder by a catheter; for the operation of turning, which is the one usually recommended and pursued in these cases, should never be undertaken until these evacuations have been effected either naturally or artificially.

As soon as the os uteri has become dilated to the size of half a dollar, sufficient to permit the introduction of the hand, it being also, together with the vagina and soft parts, perfectly soft and yielding, the membranes remaining entire, the practitioner, having been enabled to clearly diagnose the position, may carefully proceed to effect the operation of turning the child. This is, in fact, the most favorable period for the operation, as the presence of the amniotic fluid within the cavity of the uterus not only admits a ready introduction of the hand, but, by floating the child, permits it to be turned in any direction. The practitioner can not be too careful as to the time when he enters a hand into the uterine cavity: if he makes the attempt at too early a period, the most lamentable results will follow; if it be too long delayed, the hazards and difficulties are increased, and the patient suffers uselessly.

The position and presentation having been clearly ascertained, the os uteri dilated, soft and yielding, with no rigidity of the soft parts, and the practitioner having waited for a period consistent with the integrity of the membranes and the preservation of the liquor amnii, it would be unwise to wait until the complete dilatation of the os uteri. The rectum and bladder of the patient having been previously evacuated, she must be placed in position for operating; lying on her back, across the bed, with her hips brought a little over its edge, her feet properly supported by assistants, so as to flex the limbs well, and thus favor a relaxation of the abdominal muscles, is probably the position more often chosen. Some operators prefer that she should be on her knees and elbows, while others favor Sims' position, the patient resting on her left side, the limbs flexed, and the nates brought conveniently near the edge of the bed. She should by no means be exposed, but should be covered by some bed-clothing, suitable to the temperature of the season, and, for the purpose of receiving discharges, a thick layer of cloths should be placed on the floor, immediately beneath her.

The practitioner will now remove his coat, bare his arm to the elbow, and anoint it well with sweet oil or lard; if the vagina be similarly anointed, it will favor the easy introduction of the hand. To

protect himself from the discharges, a sheet or apron may be worn over his dress. While the practitioner is thus engaged, an assistant should administer an anesthetic. The patient should be brought well under its influence; it not only produces insensibility to pain, but overcomes spasmodic action, and promotes relaxation and dilatation, and thus facilitates the passage of the hand, and serves to expedite the version. Everything thus prepared, he will take his seat, at a convenient distance for operating, between the patient's limbs, or near the side of the bed, according to the position assumed by the patient; and throughout the whole operation he should be cool and deliberate, manifesting no haste, excitement, trepidation, nor hesitation.

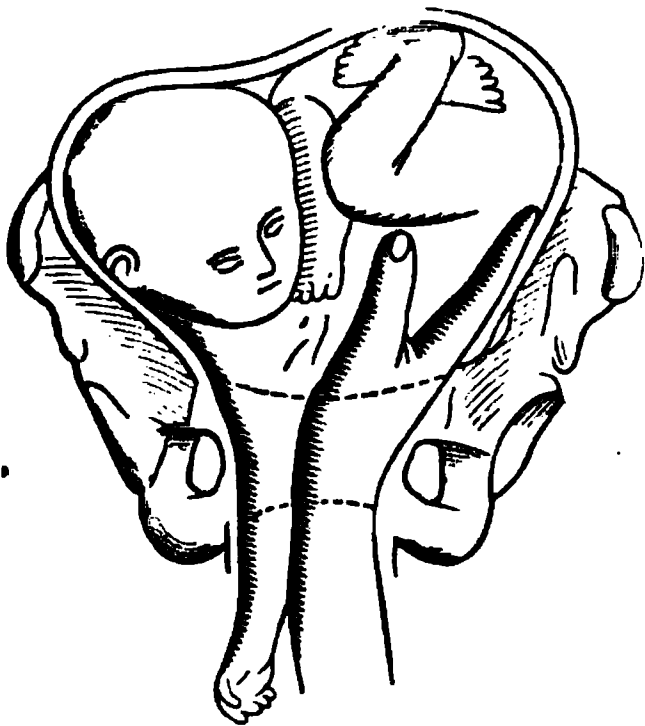
There is some choice of the hand to be introduced—that one should always be used which can the most conveniently effect the version; and the common rule is, to use the hand whose palmar surface would, when opened within the uterine cavity, be directed to the anterior surface of the child's body. Should the child's hand present, this may readily be ascertained by grasping it as in shaking hands, and that hand should be used the palm of which comes in contact with the fetal palm.

It is not unfrequently the case that the contractions of the uterus so completely benumb the hand which has been first introduced, that the accoucheur, being unable to use it, is compelled to withdraw it, and employ the other, and this will, of course, render the version much more difficult, should the liquor amnii have been discharged. Dr. Lee advises us, in all cases, no matter what the situation of the trunk and extremities, to pass the hand up between the anterior and shallow part of the pelvis, and the presenting part of the child.

The proper period for passing the hand *within the vagina*, is during a pain; the fingers may be held together, in a conical form, and thus slowly introduced, or, two fingers, then three, four, and lastly the thumb, strongly flexed into the palm, may be passed within the vulva; while passing the vaginal sphincter considerable pain will be produced, but this will be materially, if not entirely, lessened after the hand has entered the vagina. The hand may now rest stationary for a short time, to produce toleration of its presence as well as to dilate the parts. Its introduction *within the uterine cavity*, must be during the absence of pain; an attempt to pass it within the womb during a pain would probably rupture the membranes, and allow the amniotic fluid to escape before the vagina was sufficiently plugged up by the arm to prevent it. The fingers are to be passed within the os

uteri in a conical form, gently and slowly dilating this, from time to time, by separating them, and then again, with the hand in the cone shape, carefully and gently pushing it upward until it is fully within the uterine cavity. If the presence of the hand has not excited uterine contractions, followed by rupture of the membranes, the bag of waters should rest on the hand, and be passed up as far as possible

FIG. 62.



before rupturing them; the presenting part should also be pushed upward and to the left or right, according as the head may be on the left or right side of the uterus. (*Fig. 62.*) While the hand is entering the os uteri, the uterus should be kept steady by the other hand of the operator, or, what is much better, the assistant should place his hand on the abdomen, over the fundus of the womb, to steady the organ, and at the same time to maintain a gentle pressure downward, to keep the os uteri within the

strait. Usually, the membranes give way as the hand is passing within the uterine cavity, even before the feet are reached, in which case the hand and arm must be pressed firmly forward to plug up the orifice, lest the amniotic fluid escapes, thereby causing the version to be more difficult.

Should a pain come on during the entrance of the hand into the uterus, it must be kept perfectly still, and when within the cavity of the womb it should be opened and made to cover the body of the child whenever uterine contractions come on; for any attempts at moving, or resisting the action of the organ at this time might occasion its rupture. The membranes having been ruptured, the hand enters into the cavity of the ovum, along the anterior surface of the child, and should be passed up to the umbilicus, where the funis will be felt, and in the neighborhood of which a foot will generally be found. Having reached a foot, secure it between two fingers, and search for the other; and if the contractions come on, the hand must be opened and clasped over the child's body. If, after a reasonable time, the other foot can not be found, the version may be accomplished by the one foot, being certain, however, that it is a foot before attempting the change. Frequently, the contractions of the uterus are so severe that the hand of the operator becomes cramped, numbed,

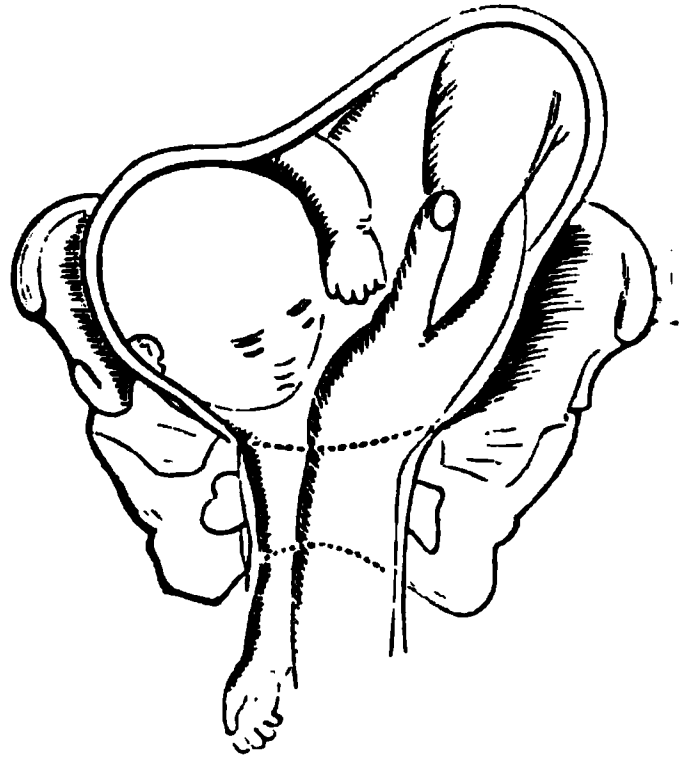
or extremely painful, and its nicer tact of feeling becomes so impaired that, without the greatest care, he may confound a hand with a foot. On this point be exceedingly cautious. We are advised by Dr. Radford, of Manchester, England, who has had much experience in difficult cases of obstetrics, "never to bring down more than *one foot* in the manual operation of turning; because the other thigh, being flexed upon the abdomen, offers a larger circumference than if it were extracted, and thus prepares the passages for the more easy transit of the shoulders and head. The advantage of this practice consists in its affording greater safety to the child; the disadvantage, in its creating more difficulty in accomplishing the evolution." (*Ramsbotham*.) The late Professor Meigs observes, in his *Obstetrics*: "At length, after more or less research, one or both feet, or a knee, is found; and whether it be one or the other, it should be taken hold of; for it is nearly a matter of indifference whether it be one foot or both, or one knee, that is used as the point on which to act in turning the child. Dr. Collins remarks, on this point, that 'it is quite sufficient to bring down one foot,' and I find that Dr. Simpson, of Edinburgh, is of the same opinion—deeming it far more injurious to make perverse attempts at exploration, than to deliver by one foot only. I say, nearly a matter of indifference, because, the object being to turn the child as soon as practicable, with proper caution it may be effected in either of these ways; it is always desirable to get the hand out of the uterus as soon as may be, and it is far better to turn by one foot or by a knee, than to incur the risk of laceration or contusion of the organ by a tedious search after the foot, which, if it be not originally near its fellow, is very hard to be found by any search for it. The inexperienced student can have little notion of the extreme difficulty there is to move the hand about while it is compressed betwixt the womb and the child; a short experiment of this difficulty would suffice to convince him of the propriety of the foregoing directions. If he should use the knee as a point of traction, it would be very easy, when the version is nearly complete, to draw the foot down. If he use only one foot to turn by, he will have nearly all the proposed advantage of the breech presentation, combined with the greater facility enjoyed in manipulating in the footling case—that is to say, he will have the abundant dilatation, and the power of traction of the limb. It sometimes happens that a foot is met with close to the orifice; so that, even without carrying the hand within the uterus, the foot can be hooked down by means of one or two fingers, as has

been done by Dr. Robert Lee, of London." It will be observed, by the following from Dr. William Leishman, Professor of Midwifery in the University of Glasgow, whose views, while more modern, are not especially different from those of the older writers, "much argument has been wasted as to the propriety of bringing down one leg or two. The sound rule in practice is, that when we succeed in securing one foot, we should never pause to search for the other, as one is all that is necessary; unless, perhaps, in cases of pelvic deformity. Nay, more than this, the descent of one leg has a positive advantage as compared with two, as thus, by increasing the diameter of the pelvis of the child, the parts are more thoroughly dilated, so as to admit of the ultimate passage, rapidly, and with comparative safety, of the head of the child. And, as this is the stage at which the life of the child is most frequently compromised, it is assumed that by abridging its duration, fetal life in the aggregate must, by this process, be saved. Still, when a very rapid delivery is desired, the operator knows that he has a better and more efficient hold upon two limbs than he can have upon one; and he will, therefore, very naturally, bring down both when they are within easy reach; but, when the discovery and seizure of the other limb involves extra effort or delay, not even in such a case as this should he be otherwise than content with what he has already achieved. The foot or knee which is lowest in the womb or easiest of access should at once be seized; but, in a transverse presentation, there is no doubt that turning will be more easily effected when we seize the leg of the side opposite to the presenting shoulder." It will thus be perceived that the most eminent accoucheurs of this country and Great Britain are opposed to any lengthy search after both feet, in cases of turning, and my own experience is in favor of performing version by one foot when there is any considerable delay or difficulty in securing both.

If it be possible to select a foot, we should take that which is opposite to the presenting hand or elbow, and which will be situated more toward the anterior part of the pelvis. The period for effecting the version is during the absence of pain, and any attempts to turn during a pain will not only be found nugatory, but may be productive of serious consequences. While the pains are off, the uterus will be found soft and yielding, and the operation may be effected with less danger; the version should be made over the *anterior* and not the posterior surface of the child, holding the limb or limbs firmly, and slowly and gently drawing them down into the vagina, and, if possible, to

the external orifice. (*Fig. 63.*) Should the uterus contract, the operator must cease his efforts, and if the pain be severe, it may be necessary for him to straighten out the hand and let the foot go, recovering it after the pain has subsided. He should place his unoccupied hand externally on the patient's abdomen, and aid in accomplishing the version by pushing the child's breech downward, while he is making traction with the other hand. As the arm is gradually withdrawn, the amniotic fluid will gush out and soil the dress of the operator, if he has not previously protected it by a covering.

FIG. 63.



The version having been completed, the patient may be carefully placed in bed, leaving the rest of the labor to the natural efforts, and managing it as directed in the chapter devoted to breech and feet presentations, being particular to have the child's face in the hollow of the sacrum when the head arrives at the lower strait. Some obstetricians recommend to terminate the delivery by a continuation of artificial efforts, gently and cautiously extracting the body whenever the pains are on; but I consider this as meddling and unnecessary; no such attempt should be made, unless circumstances are present demanding them. After the delivery of the placenta, the female should be properly bandaged, put to bed, and a soothing preparation administered, if her condition demands it, as three to five grains of the compound powder of Ipecacuanha and Opium. The indications for *Macrotys* and *Pulsatilla* may be manifest, and for several days their administration may be necessary. The weakened condition produced by so serious an operation may demand stimulation. Meet the indications promptly, as they may develop, being governed by the circumstances surrounding each individual case. She should also be kept quiet and free from noise and company, and, if possible, take a short sleep. Some gruel may be allowed, if requested.

The operation of turning, no matter how skillfully performed, is always a dangerous one for the mother, and should be performed with the greatest care and gentleness; any hasty or careless pushing, any thrusting of the knuckles in opposition to the contracted womb, any attempts at version during a pain, may occasion laceration of the

vagina, rupture of the uterus, or, perhaps, both of these may occur. "If, under your attempts to turn, you feel any fibers giving way, whether in the womb or vagina, withdraw the hand immediately."—(*Blundell.*)

Should the membranes have ruptured before the attempt at version has been made, and which is more frequently the case, the rules just given are those by which the practitioner must be guided; and the sooner he undertakes the operation after their rupture, the os uteri being sufficiently dilated, and dilatable, the greater will be the chances of safety for the mother and child, and the easier will it be for the successful accomplishment of the version.

Unfortunately, however, preternatural presentations do not always present the same features. It is frequently the case that the membranes will have prematurely ruptured, and the os uteri will not be sufficiently dilated; or, when fully dilated, there may be violent pains, with rigidity and irritation of the parts. In these instances no attempts whatever must be made to force the hand within the uterus, as they will only tend to increase the difficulty. Dilatation must be aided by the internal use of Gelsemium, in the frequently repeated small dose. The compound tincture of Lobelia and Capsicum will accomplish the same purpose, and was formerly much in use; at present the Sp. Tr. Lobelia is more often used singly, and is a most excellent agent as a relaxant, in rigidity of the os uteri. Vaginal emollient injections with or without Laudanum, according to the nature of the case, may likewise be exhibited in some instances. Fomentations to the vulva, of Hops and Lobelia combined, have been recommended to aid in the relaxation of the parts; the means already suggested, however, will usually be all that is necessary. Chloroform or Ether, inhaled to produce anæsthesia, should always be used, unless positively contra-indicated, and will undoubtedly be found of advantage, by removing the voluntary efforts of the mother, especially the actions of the diaphragm and abdominal muscles—and thus enabling the operator to more readily effect turning, even in cases where, without anæsthesia, it would have been impossible to accomplish it—though it must be recollected that the most profound anæsthesia does not completely check the contractions of the uterus.

Bleeding, *ad deliquum animi*, is the practice most commonly advised in these cases, and there is no doubt but that it will generally produce the desired relaxation, but I am decidedly opposed to it, because its after effects upon the patient are frequently irremediable; it induces a

debility of the nervous and vascular systems, which, if ever positively recovered from, will require months and even years of proper treatment to accomplish; it occasionally fails to effect the desired relaxation; and should hemorrhage or other symptoms come on after venesection, there may not remain sufficient energy or vitality in the system to successively oppose a fatal result. On the other hand, the desired relaxation can always be effected by the use of Gelsemium, Lobelia, or the combination of Lobelia and Capsicum, by which all rigidity will be overcome, the pulse will be lessened, abnormal heat and tenderness of the parts alleviated, and no strength of the patient actually lost, and should symptoms occur requiring an opposing force of the system, the patient may readily and permanently be restored to her usual vigor by the employment of stimulants.

No haste is required in these cases—viz.: when the os is not dilated, with premature rupture of the membranes, or, when it is fully dilated, the waters having been discharged, and the pains violent—the safety of the mother is the grand object, and patience is required on the part of the practitioner, together with cool, calm and deliberate action. As soon as the parts are in proper condition, the hand may be introduced, and version effected as before explained. In these cases, where the waters have been discharged, it is better to turn by a knee, than allow the hand to remain too long within the uterus searching for a foot. When the pains are very violent, and the uterus contracts firmly about the body of the child, the tincture of Gelsemium should be given, combined with a sufficient quantity of Laudanum, which will commonly arrest the powerful action of the organ, and at the same time produce considerable relaxation of it, as well as of the soft parts, so that the hand can be introduced. I have likewise found Gelsemium, combined with Aconite, *gtts xx to 3 ss* of the former and *gtts v to x* of the latter to a half-glass of water and administered in half-teaspoonful doses every half-hour or hour, as the case may require, will overcome the powerful contractions of the uterus, lessen the pains materially, and render the organ more yielding; and it is more especially in these instances where a resort to anæsthetics is advised. Of course, in these cases, the hazard to the child is always much greater.

Sometimes, although the foot descends into the vaginal cavity, yet the shoulder, being wedged in the pelvic brim, does not recede, and the more forcible the traction is upon the foot, the more firmly does the shoulder become fixed in the brim, while the breech will not pass

down. In these cases, a noose of strong tape or ribbon must be fixed round the ankle of the foot in the vagina, upon which traction may be made with one hand, in the direction of the pelvic axis, while the other, with the ends of the fingers placed against the ribs or axilla, must make at the same time a steady, upward pressure, by means of which the shoulder will be dislodged, affording, by its recession, a space for the descent of the breech. The rest of the delivery is then terminated as in the before named instances.

In cases of shoulder presentation where the arm has descended, it should never be returned within the uterine cavity, unless in attempting cephalic version, as referred to hereafter. The presence of the arm assists the practitioner in forming his diagnosis as to the position, etc., and never interferes with the introduction of the hand for the operation of turning. A piece of ribbon may, however, be attached to the wrist, for the purpose of preventing the arm from rising along side of the head after the version is accomplished, and thus avoiding any difficulty in its delivery. Any pulling or twisting of the arm is highly censurable; pulling at the arm will not assist the least in the delivery of the child, and twisting or amputating it has been performed on several occasions, in which the children were subsequently born alive, and some of whom lived to advanced age in this mutilated condition. Should any cause be present demanding the removal of the prolapsed arm, it should always be made known to the relatives, together with the reasons, previous to any attempt at the mutilation.

It will sometimes be the case that, notwithstanding our treatment, the contractions of the uterus will continue powerful and almost unremitting, obstinately resisting the slightest attempts to introduce the hand; in such instances, the only method is to wait, in the hope that spontaneous evolution may expel the fetus; but if it be dead, as known by auscultation, or if symptoms of sinking or exhaustion appear in the mother, we should proceed at once to remove the child by ex-visceration. In these instances, the child will generally be dead before interference will be required, and the grand object of the practitioner must always be to save the mother's life, if possible. In many instances Macrotys, or the mixture of Gelsemium and Aconite previously referred to, will be found very successful in overcoming this excitable condition of the uterus. And when the stomach is also irritable, rejecting almost everything exhibited, minute doses of morphia will frequently prove useful.

Dr. Matteucci, an Italian physician, asserts that chloral will arrest, or at all events, sensibly diminish uterine contractions, and may therefore be advantageously administered in cases where version can not be accomplished on account of excessive uterine action; from five to seven grains may be given, and this dose be repeated only once subsequently, at an interval of twelve minutes from the first; if the woman can not retain the remedy from vomiting, one drachm of chloral added to three fluidounces of water may be injected into the rectum, repeating the injection, if necessary, in half an hour.—Subcutaneous injection of one-sixth of a grain of morphia in the region of the linea alba, and midway between the umbilicus and pubis, has been successfully employed by Prof. Braun, of Vienna, to overcome the violent spasmodic, tetaniform contractions of the uterus. The child being extracted by version, without pains.

SPONTANEOUS EVOLUTION, is an idea, which was advanced by Denman, in 1772, who noticed that the labor, in shoulder presentations, where the liquor amnii had long been discharged, occasionally terminated by the natural efforts, the breech being expelled first, and who, consequently supposed, that the efforts of the uterus gradually turned the child so as to cause the shoulders to rise as the breech descended. In 1811, Dr. Douglas, of Dublin, showed that this view was not correct, but that the fetus instead of being turned was actually expelled doubled up. His description of the occurrence, which he has more correctly named "spontaneous expulsion," is, according to Ramsbotham, as follows: "By the continuance of the powerful uterine contractions, the whole of the arm is protruded externally, the shoulder and chest being propelled low into the pelvic cavity. The acromion then appears under the symphysis pubis; and as the loins and breech descend into the pelvis on one side, the apex of the shoulder is directed upward toward the mons veneris. Further room is thus gained for the complete reception of the breech into the cavity of the sacrum, and that part of the child's body is eventually expelled, sweeping the sacrum, and distending the perineum to a vast extent. As, during the whole of this process, the head remains above the pelvic brim, it is evident that the apex of the shoulder being external, the clavicle must be strongly pressed against the under surface of the symphysis pubis; on which point, indeed, the fetal body partially revolves, as on an axis; the other shoulder and arm, and the head, being expelled last."

Spontaneous evolution, or spontaneous expulsion, seldom happens, being more common in premature labors, and is always fatal to the

child, and exceedingly dangerous to the mother; the intense and protracted sufferings which the mother undergoes are beyond description, and no practitioner should ever trust to a delivery by this method, unless under the circumstances heretofore named, viz.: where every other resource fails. Beside, it is exceedingly doubtful whether this spontaneous action will ensue at all, except when the fetus is very small, or the pelvis much larger than ordinary. Dr. Douglas says: "If the arm of the fetus should be almost entirely protruded, with the shoulder pressing on the perineum; if a considerable portion of its thorax be in the hollow of the sacrum, with the axilla low in the pelvis; if, with this disposition, the uterine efforts be still powerful, and if the thorax be forced sensibly lower during the pressure of each successive pain, the evolution may with great confidence be expected." A labor in which spontaneous evolution is effected, requires unparalleled voluntary efforts on the part of the female, and is always accompanied with extreme bodily and mental suffering, frequently occasioning death, either before, or soon after delivery; and should the patient survive, she is commonly left with some incurable difficulty, which renders life anything but desirable. Velpeau states that, in one hundred and thirty-seven labors of this description, only twelve children were born alive. When the fetus has fairly engaged in the pelvic brim, spontaneous expulsion only can occur; when it remains free above the brim, spontaneous evolution, to a certain extent, may take place.

EXVISCERATION, should be resorted to only as a last resource, and should be employed in those cases where the membranes have been ruptured for several hours, with no advance of the labor, and also in instances where the child's body is firmly wedged at some part of the pelvis, rendering the introduction of the hand impossible or extremely dangerous. In performing this operation there is no necessity for amputating the arm, but an assistant will make traction upon it, for the purpose of bringing as much of the child's thorax into the pelvis as possible; the operator will then pass two fingers of the left hand upward within the vagina, until he feels one of the intercostal spaces, selecting a point as near the axilla as he can; the perforator is then to be passed along these two fingers, and a free opening made with it in the selected intercostal space. As it will be necessary to introduce the hand within this opening, and into the cavity of the fetal thorax, for the purpose of removing its contents, the operator may divide one or more ribs, so that the opening will be sufficiently

large. After the removal of the thoracic contents, the diaphragm may be perforated, and the liver and intestines extracted. The removal of these organs will occasion a collapse of the body, which will be expelled doubled up, if the uterine contractions are sufficiently energetic, without any further interference: but if the pains are weak and inefficient, or have entirely ceased, the delivery must be artificially accomplished by the crotchet, removing rib after rib, hips, buttocks, etc.; or the instrument may be "carried through the opening and fixed within the fetal ilium; the breech will soon be observed to descend, and the case will be terminated as though nature had expelled the child unaided."

Ramsbotham refers to an operation for *decapitating* the child, in transverse presentations, when turning is impracticable, and when the neck is directly over the brim: fortunately, I have never had occasion to resort to it. He recommends the finger to be passed around the neck, a large-sized blunt hook to be introduced upon it, and the presenting part to be then brought as low into the pelvis as is consistent with the woman's safety. The hook must then be steadied by an assistant, while the operator introduces the decapitator (a hook with an internal cutting edge) by the side of the blunt hook: this latter is then removed, and the finger of the left hand being kept constantly in contact with the blunt point of the cutting hook, a sawing motion is communicated to it by means of the right hand, and the separation is thus effected; after which the child's body may be drawn out by the protruding arm, and the head removed by a crotchet or blunt hook, introduced into the mouth or the foramen magnum. These operations, of course, are only to be performed when the child is dead, and which will almost always be the case before a resort to them will be sanctioned by a skillful accoucheur.

In cases of shoulder presentation, CEPHALIC VERSION has occasionally been attempted, in which the presenting part has been pushed away and the head brought to the brim; but the operation has not received the sanction of many obstetricians, on account of the difficulties attending it. Professor Meigs, in his work on Obstetrics, remarks: "It may be that those old practitioners of the days of Queen Elizabeth may have sometimes succeeded, by pushing up the presenting shoulder, in getting the head at last to come to the strait again, but such an event appears to me in any case most improbable." Professor Miller observes: "Cephalic version has but few advocates at the present day, and is confessedly applicable to such a limited

number of cases, that it is scarcely worthy of our formal consideration."

It will thus be seen that authors generally agree in considering cephalic version, at best, a doubtful expedient, and one to be attempted only as a dernier resort in some particular instances; yet, notwithstanding the observations of the above gentlemen concerning this operation, and the disrepute in which it is held, Dr. M. B. Wright, a former talented and skillful physician of Cincinnati, and Professor of Obstetrics in the Ohio Medical College, has made known a method of cephalic version, which, I think, will become the more general practice in the management of shoulder presentations as it becomes better known: since having perused his essay, I have tried his method in several cases, and was highly pleased at the successful results. Dr. Wright's essay was on "Difficult Labors and their Treatment," and was read before the Ohio State Medical Society at one of their meetings, who awarded a gold medal to him. In order that my readers may understand his views, I will give his own language and quote freely from his essay. After describing several cases treated successfully, he remarks:—

"Now after all this, are we not justified in declaring:

"1. That at an early period in labor, and especially if called before the uterus has been deprived of its liquid contents, a shoulder may be converted into a vertex presentation more easily than turning by the feet is ordinarily performed.

"2. That although the membranes may have been long ruptured, turning by the head can be accomplished with great facility.

"3. That delivery by *cephalic version* may be speedily effected, after repeated and ineffectual efforts have been made to turn by the feet.

"4. That *cephalic version* should receive a prominent, nay, leading place, as a means of expediting delivery in shoulder presentations.

"The second of the questions already proposed is, what mode of proceeding will prove most favorable for the mother?

"In his chapter on Podalic Version, Churchill observes: 'On the other hand, its disadvantages are not to be overlooked. From the distance the head has to traverse, and the difficulty of seizing the feet, and of turning the child in utero, there must ever be a fearful risk of injury to the mother.'

"Upon an examination of the tabular views given by Lee, we find that out of seventy-one cases of shoulder presentations, in which turning by the feet was resorted to, 'seven women died from rupture, and three from inflammation of the uterus!' Laceration and inflammation of the uterus are, therefore, the consequences chiefly to be

dreaded. Four of these cases of rupture occurred in the practice of other accoucheurs, and three in patients under my own care, and where no great difficulty was experienced or force employed in turning.' * * *

"In *cephalic version* the hand does not enter the cavity of the uterus, and, consequently, neither its walls, nor any portion of them, are forcibly pushed out. The fetus is moved comparatively little within the uterus, the head being already near the superior strait; while in *podalic version* the part to be first delivered is most remote from the canal through which it must pass. In the former, the injury to the mother can not result without great awkwardness on the part of the obstetrician, while in the other we have reason to feel surprised at the escape from injury. In turning by the feet, the hand must necessarily be moved considerably within the uterus, and often while it is contracting violently. In turning by the head there is but little, if any, direct contact of the hand within the uterus. In the one case, contusion of the uterus by the hand is to be expected; in the other case there is no injury, because there is no contact. Turning by the feet may occasion a severe nervous shock: not so in changing the shoulder for the head.

"How may the life of a child be best preserved? is the third inquiry to be briefly answered.

"In describing the disadvantages of turning by the feet in all cases, Churchill says: 'The mortality among the infants thus brought into the world is very great. As far as our statistics extend they yield 174 out of 518 delivered, or one in three.'

"The mortality in shoulder presentations is, doubtless, greater than this. In the first place the position of the fetus weakens its hold upon life. In the second place the hand is more difficult of introduction into the uterus in shoulder than in head presentations, and whatever force is required is sensibly felt by the fetus, and upon that part of the body where pressure is made with the least impunity.

"A timely resort to *cephalic version* gives to the fetus almost as much certainty of life as if the presentation had been originally of the head. Why not? The manœuvre amounts to but little more than in rectification of deviated head positions.

"We are informed by Churchill, that 'Bush gave an account, in 1826, of fifteen cases, in which *fourteen* were born living. In 1827, Ritgen collected forty-five successful cases. Riecke has had sixteen cases.' In all the cases treated by myself from the beginning, the children were born alive. The liability to compression of the cord

and consequent death of the fetus, is in proportion to the length of the labor, or rather to the descent of the fetus in the cavity of the pelvis. Hence, to be wholly successful, cephalic version should be performed a short time before, or soon after the commencement of the second stage of labor.

“Can any one mode of treating shoulder presentations be relied on exclusively? The answer must be in the negative. We are disposed to adopt the language of Cazeaux, “that at the present day it would be improper to embrace either opinion exclusively, for some cases are better suited to the cephalic version, while there are others on the contrary, where the pelvic one is alone practicable; consequently, both operations should be retained in practice, leaving the judgment of the accoucheur to determine the cases, where the one or the other ought to be preferred.” And we will conclude this part of the subject by stating a few of the circumstances under which the different modes of turning may be adopted.

“Turning by the feet is to be preferred in cases of inefficient uterine action, or in exhaustion from long continuance of labor; in hemorrhage, convulsions, or in any case in which there may be a demand for speedy delivery.

“Turning by the head should be selected in all cases where difficulty arises from mal-position merely; or in convulsions, hemorrhage, or prolapsus of the funis, if the uterus should be engaged in vigorous expulsive efforts. In rupture of the uterus our great reliance is in artificial delivery; and the question naturally suggested would be, which will guarantee the greatest safety, podalic version, or cephalic version aided by the forceps? And we would be guided in our action by the answer we gave to the question.

* * * * *

“THE HAND TO BE USED.—The relations of the fetus to the pelvis having been ascertained, and the patient placed in a proper position for the version, the next question is, which hand shall be introduced into the vagina? We answer, the hand, the palm of which is directed naturally toward the breech of the fetus. It will be seen at once, that if the fetus is to be moved in the direction of the breech, and in correspondence with the right side of the mother, and the left side of the operator, the right hand could be used with most success. In cases in which the head occupies the right iliac fossa, a choice could be given to the left hand.

“THE PROLAPSED ARM.—It is generally conceded, that in turning by the feet, it is not necessary, nor would it be advantageous,

to return above the brim of the pelvis, the arm which may have fallen, or been brought into the vagina. In turning by the head, on the contrary, its reposition admits of no doubt; it is imperatively demanded. It is not demanded in consequence of any difficulty in moving the shoulder by its presence, but in the adjustment of the head at the superior strait, and its subsequent descent through the pelvis. By bending the fore-arm of the fetus until the hand is directed to the upper portion of the vagina, and then pushing up the arm, the entire member will soon ascend above the brim of the pelvis, and be no longer an obstacle to complete version.

“The uterus undergoing gradual distension by the growth of the fetus, and by increase in the quantity of liquor amnii, is not from this cause alone excited to an expulsion of its contents. Let a strong and sudden mechanical force be applied to the fibers of the uterus, even to a limited extent, and contraction will speedily follow. If any portion of the fetus should be pushed forcibly against the fundus of the uterus, by attempts to rectify a mal-presentation, a more than corresponding resistance would soon apprise us of a want of adroitness, and the probabilities of failure. The hand of the manipulator in the vagina imparts a sense of fullness, and induces expulsive efforts on the part of the mother. Pressure on the internal face of the perineum, or along the recto-vaginal septum, urges the uterus to renewed or more energetic action. Simple contact of the uterine and fetal surfaces in turning does not produce undue contraction of the uterine walls. The presence of the hand, added to that of the fetus, within the uterus, is a common cause of irritation and expulsive force. But the fact, which we most desire to enforce here, is, that when the fetus, in the operation of turning, is moved in straight lines, and sensibly displaces the uterine fibers with which it comes in contact, it is speedily forced back to its original mal-position; nor can its displacement be easily rectified, except it be moved in conformity to the curvatures of the cavity in which it is contained. * * *

“THE MANNER OF PERFORMING CEPHALIC VERSION.—Suppose the patient to have been placed upon her back, across the bed, with her hips near its edge—the presentation to be the right shoulder, with the head in the left iliac fossa—the right hand to have been introduced into the vagina, and the arm, if prolapsed, having been placed, as near as may be, in its original position across the breast. We now apply our fingers upon the top of the shoulder, and our thumb in the opposite axilla, or on such part as will give us command of the chest, and enable us to apply a degree of lateral force. Our left hand

is also applied to the abdomen of the patient, over the breech of the fetus. Lateral pressure is made upon the shoulders in such a way as to give to the body of the fetus a curvilinear movement. At the same time the left hand, applied as above, makes pressure so as to dislodge the breech, as it were, and move it toward the center of the uterine cavity. The body is thus made to assume its original bent position, the points of contact with the uterus are loosened, and perhaps diminished, and the force of adhesion is in a good degree overcome. Without any direct action upon the head it gradually approaches the superior strait, falls into the opening, and will, in all probability, adjust itself as a favorable vertex presentation. If not, the head may be acted upon as in deviated positions of the vertex, or it may be grasped, brought into the strait, and placed in correspondence with one of the oblique diameters.

“It will be observed that we do not act upon the shoulders by raising them. Perhaps a slight elevation would facilitate the movement already described—or it might be better to depress them—and again, by lateral pressure, without either elevation or depression, our object might be accomplished. *Pushing up the shoulders*, therefore, does not constitute a prominent part of turning, if by pushing up is meant the mere raising of the shoulders above the brim of the pelvis.

“As the body of the fetus makes its curved movement under the hand of the operator, it advances upward, as well as laterally, by a combined, rather than a single action, which would give it only one direction.

“The back of the hand, with which we have been acting upon the shoulder, is toward the head of the fetus—consequently, its hold upon the head would be apparently slight—yet, after the shoulders have reached the iliac fossa, the vertex may fall upon the palm of the hand in occupying the strait, and its adjustment become easy. If, however, there should seem to be a necessity for grasping the occiput, there could be no reasonable objection to a speedy change of hands.

“The entire process of cephalic version is to be adopted in the absence of uterine contraction; or, rather, during the intervals of expulsive force. And, as it is now a vertex presentation, we must be governed, as to the time and manner of delivery, by those general rules applicable to such cases.

“In all our cases, except the one which terminated as a face presentation, the occiput assumed a position corresponding with the first or second position of the vertex. In this case the occiput was before

one of the ~~sacro~~-iliac symphyses, and to this fact we have attributed the tendency of ~~the~~ occiput to slide above the brim of the pelvis, and the difficulty in keeping it in place. If there had been the usual degree of uterine contraction, however, the head would, in all probability, have become fixed, and the presentation would have continued as one of the vertex, instead of changing for the face. •

“It will be seen that we lay no claim to the introduction of cephalic version as a mode of treating wrong presentations, and expediting delivery. A very brief examination of the subject, however, may induce some to award to us originality in respect to the means by which a successful change of presentation may be accomplished.

“That cephalic version, by external manipulation—by acting upon the fetus through the parities of the abdomen and uterus—should have few advocates, is not surprising. To be successful, it confessedly requires a combination of favorable circumstances not often presented. The tissues both of the abdomen and uterus must be thin and yielding—the liquor amnii must have been retained, and in considerable quantity—and the fetus must be proportionally small.

“In all the obstetrical works we have examined, in which cephalic version is recommended by internal manœuvre, it is directed to *raise* the shoulder as the first necessary impression upon the fetus. Viewed anatomically or mechanically, men have not been persuaded into the belief, that raising the shoulder can facilitate the permanent descent of the head into the superior strait. They claim, what is apparent to the eye in viewing a proper engraving, and as it can be demonstrated with the manikin, that the elevation of the shoulder at the brim of the pelvis, tends to increase the long diameter of the fetus, and the transverse diameter of the uterus, and without any favorable adjustment of the head after pressure upon the shoulder has been withdrawn.

“Suppose we follow out the directions given by some, and after the elevation of the shoulder, attempt to force the body of the fetus in a lateral direction, will not the breech impinge against the walls of the uterus transversely? To enable the head to engage in the superior strait, the body must be entirely removed from it, and this can only be done by raising the breech toward the fundus of the uterus. Raising the shoulder, therefore, is very naturally considered a means to prevent cephalic version. And we are not surprised that podalic version is almost universally adopted in the treatment of shoulder presentations.

“If our mode of performing cephalic version is sufficiently clear, in the description already given, it will readily be distinguished from

others. We claim for it great importance, on the ground that it is easily executed—that the mother and fetus receive no injury—that there is little or no danger of subsequent displacement after the vertex has been fully adjusted—that, although it is most successful in recent cases, delivery may be accomplished after the membranes have been long ruptured—that it may be executed, after ineffectual efforts to bring down the feet.”

I commend these views of Dr. Wright, together with his mode of performing cephalic version, to the special attention of the profession, and more especially, as in shoulder presentations, his operation is much more easily and promptly performed than the “combined external and internal version” of Dr. Braxton Hicks.

CHAPTER XXXV.

ON PRETERNATURAL LABOR—TRANSVERSE PRESENTATIONS—PROLAPUS OF THE UMBILICAL CORD—PLURALITY OF CHILDREN—MONSTERS.

THE transverse presentations which follow, are rarely met with, and some obstetricians have expressed doubts as to the possibility of their occurrence. However, as they are treated of by several writers, I have deemed it proper to make a brief reference to them.

Should the *Side* of the child present, it may be distinguished from the head by its want of firmness and roundness, as well as by the absence of sutures and fontanelles; from the breech, by the want of the furrow between the two rotund nates, with no coccyx, anus, or genital organs. The principal discriminating signs of a side presentation are the presence of two or three ribs, with the intercostal spaces; and should any doubt exist, the hand should be passed into the vagina sufficiently to allow two fingers to be carried fully up to the superior strait. A single intercostal space may be mistaken for the sagittal suture.

If the child's *Back* presents, three or four of the spines of the vertebræ can be detected, and also the origins of the ribs; and these may be felt even previous to the full dilatation of the os uteri.

A *Sternum* presentation may be known by the introduction of two fingers, which will distinguish the sternal bones, the continuance of the bony plane, the cartilages of the ribs at their origin from the sternum, and the intercostal spaces.

When the *Abdomen* presents, there will be felt no osseous prominence, but only the large, soft abdomen, and, perhaps, the ensiform cartilage may be distinguished, as well as the insertion of the umbilical cord; though the practitioner must recollect that the cord itself may present when the abdomen does not, as in prolapsus of the cord.

It is recommended in all these transverse positions to effect the delivery by turning, the practitioner being governed in the operation by the rules given under the management of Shoulder Presentations.

A PROLAPSUS OF THE CORD, is where the umbilical cord presents along with the head, nates, or extremities of the child, and may be considered under the head of Preternatural Labor. It is not frequently met with, having occurred, according to statistics, 437 times in 105,146 cases, or about 1 in 240. Of itself, the falling of the cord has no influence upon the advance of labor, its smallness of size and compressibility offering but little or no hinderance to the passage of any part of the child through the pelvic canal. The danger is to the child, which, from pressure upon the umbilical vessels, may die by asphyxia. Until the fetus is expelled into the world, its life depends upon, and is sustained by, a free circulation through the arteries and vein of the cord, and any suspension of this circulation, by compression or otherwise, will necessarily occasion death, by interrupting the communication between the child and its mother. We may form some idea of the peril to which the child is exposed from the statistics of various authors, in which 245 children were lost out of 392 cases of prolapse, being considerably more than one-half.

Various circumstances have been referred to as favoring, or causing a descent of the cord; as mal-positions of the child; an uncommon length of the cord; uterine obliquity; and malformation of the pelvis, especially the contracted pelvis. A small child, with an excessive amount of liquor amnii, may contribute to the descent of a loop of the cord, by allowing the fetal head to move away from the pelvic brim. When there is a copiousness of the amniotic fluid, the sudden rupture of the membranes being followed by a forcible gush of this fluid, may carry with it a loop of the cord; and this would be more likely to occur should the patient be standing, or in some other unfavorable attitude when the rupture happens. Prolapse of the cord may also arise from a want of energetic contractions of the uterus, in which the fetal head is not maintained with sufficient power at the superior strait, nor closely enough adapted to the inferior segment of the uterus. The attachment of the placenta near the os uteri, by which the cord

is held just at the orifice of the uterus, likewise favors a prolapsus. Cases have occurred which were not due to any of the above-named causes, and which could not be satisfactorily accounted for. Considering the length of the cord, and facility with which it moves about in the liquor amnii, it is somewhat surprising that prolapsions of it are not more frequently met with. Vertex presentations are less frequently complicated by prolapse of the funis, than footling, in which it is often encountered. It is more dangerous in vertex, less so in shoulder, and least of all in feet presentations.

DIAGNOSIS.—Prior to the rupture of the membranes, it is very difficult, if not entirely impossible, to detect the cord; it is only after the rupture that we can determine its prolapse with any degree of certainty. The cord then hangs down in the vagina, is of more or less length, sometimes passing down beyond the vulva; its roundness, smoothness, and softness may enable the practitioner to distinguish it when in the vagina, and especially its pulsations, if the circulation has not been suspended, and which are not synchronous with the pulse of the mother; when it appears externally, it can be readily recognized. Care should be taken not to mistake a prolapsed intestine for a loop of funis; this has been done, the coil of intestine passing through a rent at the superior part of the vagina, or through a ruptured uterus,—and which, in several instances was cut in two, under the erroneous supposition that it was the cord.

TREATMENT.—In the management of cases of this character, various modes of treatment have been advised, but none of them have been generally successful. If the cord be cold and flaccid, with no pulsations, the child will undoubtedly be dead, and as assistance is required only for the safety of the child, the labor should be allowed to progress without any interference, unless called for by other circumstances. We must, however, be cautious in pronouncing the child's death, for the pulsations may cease during the contractions of the uterus, and return again as soon as these have subsided; beside, instances have occurred where the pulsations have not been recognized for ten or fifteen minutes, and yet the child has lived. If the membranes have not ruptured, when the prolapse is detected, care should be had to preserve them entire until full dilatation of the os uteri, and thus prevent any dangerous pressure upon the cord, until the chances are greater for affording relief.

The several means recommended by authors, in cases where the child is known to be alive, are as follows:

1. Returning the prolapsed cord above the superior strait and the presenting part of the child, and retaining it there until this has so

far descended that any further prolapse will be prevented. If this could always be accomplished, it would be a very certain and desirable method; but, usually, the difficulty is not detected until after the membranes have ruptured, and the head together with the cord have been forced down into the brim; and then any such attempts would not only prove unsuccessful, but, if persisted in, might still further increase the difficulty by displacing the head. Not unfrequently the os uteri may be incompletely dilated, and then any attempts to return the cord would be impracticable. When it is fully dilated, the attempt to elevate the presenting part, or to carry the fingers with the cord between the os uteri and the presenting part might occasion a return of the pains, and thus prevent the reposition from being accomplished. Various instruments have been presented to the profession for the purpose of returning the cord; but I have less confidence in their utility, at least so far as I have become acquainted with them, than with the manual method, by which a few cases have been saved. When the waters have been freely discharged, and the uterus acts with energy, any attempts to return the cord will almost always be unsuccessful.

If the cord can, however, be carried above the presenting part, by the introduction of the hand in the vagina, and two fingers into the uterine cavity, I would advise placing it in the axilla, if possible, or above the knees; and if these can not be effected, to carry it carefully from one side to the other. However, it too frequently happens, that after the cord has been raised above the presenting part, it immediately prolapses again on the removal of the fingers. This has sometimes been prevented by introducing a piece of soft sponge, carrying it upward with the cord.

2. If the head has not entered the pelvic cavity, but is still at the brim, a resort to turning has been advised, provided the os uteri be fully dilated and not rigid; but as this operation is always attended with danger to the mother, we should not too hastily nor too rashly decide upon it. If the soft parts be well dilated, the pelvis capacious, and the female has given birth to one or more children previously, the child may possibly be saved by the operation; but the accoucheur should always remember that no interference, of whatever nature, is justifiable, which has for its object the safety of the child at the risk of injury or death to the mother. Where turning has been performed, about seven out of ten children have lived: the consequences to the mother are not given. Merriman advises turning only in instances where the child is living, as known by the pulsations of the cord, the

head not having entered the pelvis, the parts relaxed and os uteri well dilated, and the pains weak and inefficient; and even then it should not be attempted, unless the practitioner has had some experience in the operation. Dr. Collins says: "As to turning, the risk to the mother is, in the majority of cases, so great as to forbid its employment, nor do I think the practitioner justified by the circumstances in so greatly hazarding his patient's life."

3. If the head has escaped into the vagina, and the pulsations of the cord are felt, and especially when they are diminishing or becoming feeble, the delivery may be hastened and the child's life saved by a resort to the forceps, and this may be accomplished with but very little risk to the mother. The forceps must be carefully applied, so as not to fix the cord between either of its blades and the head, and the extraction must be as rapid as possible, but always consistent with the safety of the mother. Unfortunately, however, we more frequently find the child destroyed by the compression of the cord, before the instrument can be applied.

4. It has been recommended to place the cord in the angle formed by the junction of the sacrum and ilium, where it will be less exposed to compression, and that sacro-iliac symphysis is to be selected, which will not be occupied by the forehead or occiput. This has sometimes proved successful, and will probably answer in cases where the pelvis is large and the head small. In ordinary-sized pelves but little reliance can be placed in this method.

5. The "postural treatment," by Professor T. Gaillard Thomas, M. D., of New York city, appears to have been more generally successful than any other method. This method consists in inverting the uterine axis or long diameter, by placing the woman upon her hands and knees, the face or shoulders resting upon a pillow, while the hips are elevated as much as possible, so that if the membranes are not ruptured, the cord will sink below the brim and toward the uterine fundus by gravitation alone. But if the membranes be ruptured, the patient keeping the position named, the accoucheur, introducing his whole hand into the vagina, will seize a loop of the cord between his fore and middle fingers and carry it up to the pelvic brim, holding it there until the whole of it has glided downward along the anterior surface of the child toward the fundus. The woman will retain her position until the pains have engaged the presenting part in the brim to such an extent that there is no longer any danger of a renewal of the prolapsus, when, she may be carefully turned upon her back, and the labor be allowed to proceed as usual. As this position tends, from

gravitation, to delay the entrance of the presenting part into the pelvic cavity, however strong and regular the pains may be, the accoucheur, passing a hand each side of the patient, should lock the fingers of the hands, and make sufficiently strong pressure, during each pain, in a direction toward the superior strait, so as to sustain the weight of the uterus and its contents, as well as to keep the presenting part in close proximity with the brim. And during the intervals the uterus may be sustained, so as to prevent recession of the presenting part, by means of a folded blanket or firm cushion placed between it and the bed.

If the prolapsus be ascertained at an early period of the stage of labor, it will be unnecessary to place the woman in the above position, [which is very irksome, and which may also, when long continued, occasion a sense of suffocation from pressure upon the diaphragm], until this stage is nearly terminated, or until there is indication that the presenting part will shortly engage in the brim—the membranes, of course, being unruptured.

If the membranes are ruptured, and the funis when carried to the brim does not glide toward the uterine fundus, it will be necessary to carry the hand and cord within the uterine cavity, even as far as the child's breast.

The position is not an elegant one, and many women will object to or decidedly oppose it; but when it is fully explained to them, the reasons therefor, and the dangers to the child, few mothers will persist in their opposition. An inclined plane can be arranged with the bed clothing or otherwise, with a soft covering upon which the woman can rest, and which will be much easier and less objectionable to her, besides obviating the necessity for the support, named above, to the uterine tumor.

Of these various modes, the selection must be left to the judgment of the accoucheur, who will determine according to the stage of the labor, the condition of the soft parts and os uteri, the conformation of the pelvis, the presenting part of the child, and various other circumstances which may be present. In a premature labor, I should advise no other interference than that named in method No. 4. No. 5, the "postural treatment," will, however, be found the best, suitable for nearly, if not quite, all cases, rendering a recourse to turning or instruments wholly unnecessary.

The patient's friends should always be informed of the fact, when there is a prolapsus of the funis, together with the great probability of the child's being still-born; and should she exhibit any surprise or

uneasiness at our uncommon attentions, there is no harm in acquainting her that "the cord has fallen down, adding, however, that it will not interfere with the labor in the least, but may occasion the child's death;" nor would there be any impropriety in explaining to her the uses of the cord, and the reasons why the child may be lost, as well as the necessity for the measures about to be pursued.

It is also proper to have the ordinary means for resuscitating the child in readiness, and which should be used in all instances when delivery has been effected shortly after the cessation of the pulsations of the cord, the slightest action of the heart being a sufficient cause for attempting resuscitation.

Professor Meigs suggests the following measures in prolapse of the funis, which, however, had not been tried by himself; "Take a piece of ribbon or tape, a quarter of an inch wide and four or five inches long. Half an inch from the end, fold the tape back, and sew the edges so as to make a small pocket. Then fold the other end in the opposite direction, and sew that also to make a pocket of it. Now, if the cord be taken in the tape, and held as in a sling, a catheter may be pushed into one of the pockets, and that one thrust into the other, so that we shall have the cord held as in a sling, which is itself supported on the end of the catheter or uterine-sound. Let the catheter be now pushed up into the womb, beyond the fetal head: it will carry the secured portion of cord with it, and the catheter being withdrawn, the tape is left in the uterine cavity, where no harm can be occasioned by its presence. If required, several such tapes could be secured round the cord, and all of them fixed on the end of the same catheter, and pushed at the same moment far up within the cavity of the womb." This plan may answer in some cases, but I doubt its general application. Dr. Arneth has succeeded in saving ten out of eleven cases, by carrying up the cord, with the introduction of the whole hand into the uterine cavity.

In a previous part of this work I have made some observations relative to COMPOUND or MULTIPLE PREGNANCY, the signs by which it may be suspected or recognized, and the several circumstances under which it may be present. At this place I shall refer more particularly to the management required for such cases. According to statistics laid down by Churchill in his work on Obstetrics, 167,676 cases occurring in British practice, 2,572 were twins, or about 1 in $65\frac{1}{3}$; and 37 were triplets, or 1 in $4,531\frac{1}{3}$. In 36,570 cases in French practice, there were 332 twins, or about 1

in 110; and 6 triplets, or 1 in 6,095. In German practice, 251,386 cases gave 2,967 twins, or about 1 in 84; and 35 of triplets, or about 1 in 7,185. The average occurrence of the whole, 455,632 cases, would be 5,871 of twins, or 1 in $77\frac{1}{2}$; and 78 of triplets, or 1 in 5,840.

In the plurality of children, or where women give birth to two or more, the danger is always greater than in single pregnancies, being about 1 in 20; yet many females are promptly delivered with but little more pain than in cases where one child is born. The danger in these is owing principally to an over-distension of the uterus; to a preternatural presentation of one or both children; to hemorrhage after the expulsion of the placenta, the uterus contracting feebly or not at all; and not unfrequently, inflammation of the veins and deep-seated structures of the uterus occurs, terminating fatally.

The mortality to the children in twin births is, according to statistics, about 1 in $3\frac{1}{2}$; in triplets, 1 in 3. Though it must be recollected that in this calculation the death of the child can not, in every instance, be attributed to the labor. In 184 twin cases recorded, 43 were still-born; and in 240, premature labor occurred 54 times, with 12 cases of a putrid fetus. The fatality appears to be greater among male children, and especially when they are twin cases of opposite sexes. These statistics are based upon the records of various accoucheurs, and may be found in detail in Churchill's Midwifery.

DIAGNOSIS.—The difficulty in diagnosing twins during pregnancy has already been spoken of; but at the time of labor, after the expulsion of the first child, the presence of a second can be positively determined, and it is the duty of the practitioner to institute a proper examination, that he may have no doubts upon the subject. A plurality of children may be suspected, from the uncommon size and shape of the abdomen, though it is frequently the case that in this respect the female is not larger than those who carry but one child; from the feeble and irregular action of the uterus, even after the labor has continued for several hours; and from the slowness with which the bag of waters is formed. After the delivery of the first child, its small size may likewise occasion us to suspect that there is another. Yet these various circumstances may be present, and the case be one of single pregnancy.

It is, therefore, required of the accoucheur, in every case of labor which he may attend, immediately after the birth of the first child, to place his hand on the abdomen of the mother, for the purpose of ascertaining whether there be a second child; if there be another, he will find the uterus still hard, large, and unequal; the fundus remain-

ing at the epigastrium, or considerably above the umbilicus, and occupying nearly as much space as previous to the birth of the first. He should not, however, stop at this external exploration; it is absolutely necessary that he positively ascertain not only the presence of another child, but likewise its presentation and position; and to effect this will require an internal examination. Holding the cord of the first child tense with one hand, but without making any traction upon the placenta, he will pass one or two fingers of the other hand along the cord, and if another child be present, the fingers will come in contact with the second bag of membranes, when he should correctly ascertain the nature of the presentation, after which it will always be proper for him to inform the husband or nurse of the fact; but it should not be immediately made known to his patient, lest such a depressing influence on her mind be caused, as to materially retard the delivery of the second child. No particular secrecy is necessary, but the time of giving the information to the patient should depend much upon her mental and physical condition, and the circumstances connected with her case. It may be proper to observe here, that practitioners have been deceived in both their external and internal examinations, having mistaken a large placenta, a large quantity of coagula, an accumulation of blood behind the membranes of the retained placenta, etc., for the sac of another child: on rupturing these, the escape of blood or coagula, instead of the amniotic fluid, will at once solve the case.

TREATMENT.—Usually, there are no suspicions of a twin labor until after the birth of the first child, and the delivery may proceed as favorably as in single cases. But it frequently happens that the force and frequency of the pains become greatly diminished, in consequence of the uncommon distension of the uterus; or the contractions being energetic, the delivery progresses slowly, because the contracted uterus can not act directly upon the whole of the body of the child which first reaches the superior strait. And in cases of premature labor occasioned by twin pregnancy, the delivery may be delayed, from the immatured condition of the cervix uteri, which has not undergone those changes which facilitate its dilatation at full term.

When the practitioner suspects twin labor in a case where the delivery of the first is proceeding very slowly, and more especially when his suspicions are strengthened by hearing sounds of the fetal heart at two distinct locations, he must be very cautious how he ventures to administer Ergot, or other agents to increase the action of the uterus, prior to the birth of the first child: no interference of this kind is required,

or at all necessary. The labor should be allowed to proceed, no matter how slowly, until the first child is born. But should any accidents or circumstances offer requiring aid, they should be treated in the same manner as recommended when they occur in single labors; being careful, however, should a resort to turning be deemed advisable, as in a shoulder presentation, to obtain a hold of the feet of the right child before making the evolution. If the children are contained in one sac, or if there are two sacs and both have become ruptured, a difficulty in relation to this matter will be very apt to occur. By passing the hand along the external part of the limbs, until it reaches the breech or genital organs, we may avoid the mistake of bringing down a limb of each child. As a rule, each child has its own bag of membranes, and its own placenta, and the placenta of the child born first should not be removed, until after the birth of the second child, as it will almost certainly give rise to more or less serious hemorrhage.

As I have already, when treating on the Management of Labor, recommended two ligatures to the umbilical cord, previous to separating it, it is unnecessary to enter into any special remarks upon the subject at this place. After the birth of the first child, if the presentation of the second is proper, and the contractions of the uterus continue, no interference is necessary; indeed, it not unfrequently happens that the pains are so energetic, and the expulsion so rapid, that the second child is born before the first can be separated from its cord. But in cases where there are no pains after the birth of the first child, or, when they are present, but feeble and inefficient, means should be used to forward them, after having waited some fifteen or twenty minutes. A bandage should be firmly applied around the abdomen, frictions and compression should be made over it upon the uterus, and as the passages are already dilated there is no objection to the administration of Ergot; in fact, if there is delay in normal expulsive action, its judicious administration is commended, or stimulants, if necessary, should likewise be exhibited internally. Should the second child present naturally, that is, either the head or breech presenting at the brim, and half an hour or an hour has passed since the birth of the first, the application of the bandage, together with the artificial rupture of the membranes, will generally occasion a renewal of the contractions, and delivery will be terminated without any further interference.

In ordinary cases, where the pains do not return, notwithstanding the means employed, I would not advise the accoucheur to wait beyond an hour; because the parts being yet soft, dilatable, and amplified from the expulsion of the first child, the second may be expelled with more facility, and with less suffering to the mother, than would be the case if a longer delay was permitted. The hour having therefore expired, and no return of uterine action, the presentation of the second child being known, the parts being soft and yielding, and the os uteri dilatable, the membranes should be ruptured, and, if necessary, the hand passed upward to reach the feet, and the evolution proceeded with according to the rules already given, being very careful not to empty the uterus of its fetus before contractions come on. Too sudden an evacuation of the uterus may give rise to hemorrhage, inversion, or other accidents.

Turning, however, must never be attempted when the resources of nature are adequate to the expulsion of the child.

After the delivery of the first child, the parts of the female being soft and yielding, and also sufficiently amplified by its expulsion, a foot or breech delivery of the second child, either natural or effected artificially, is by no means so difficult or so painful to the mother, as in similar labors with but one child; nor, as a general thing, is the safety of the child so greatly compromised. In a shoulder presentation of the last child, cephalic version, according to Dr. Wright's method, in the last chapter, might probably be performed with success.

Sometimes, the female becoming very much fatigued and worn out by the tediousness of a twin labor, may require artificial aid, as for instance, with the forceps, for the delivery of the first child; and in such cases, it will generally be found advantageous as well as necessary to expedite the delivery of the second by bestowing similar assistance. Interference will always be demanded during the expulsion of the second child, when it presents transversely, or when it is complicated with convulsions, hemorrhages, or other accidents. And these complications must be combated according to the rules advised for them, when occurring in single labors.

Hemorrhage is always to be dreaded in twin births, and must be most carefully watched; it may almost always be ascertained at an early period, even before the practitioner would be led to suspect it from the character of the discharge externally, by closely observing the expression and color of the patient's face. When hemorrhage occurs before the birth of the second child, it will demand prompt action, the labor must be hastened by turning, if the presenting part is above the superior strait—by the forceps, when the head is in the

pelvic cavity. Hemorrhage after the birth of the second child, must be treated as hereafter recommended for hemorrhage occurring previous to, or after, the birth of the placenta, as may be.

Occasionally, there will be a simultaneous presentation of parts of the two children, as, the two heads, the feet or arms of each, or the head of one with the extremities of the other, etc. In these cases, it will be necessary to push up one of the presenting parts, in order that the remaining one may advance; and should these double presentations prevent the labor from progressing safely, a resort to instrumental aid may be demanded, as decapitation of one child, or such other measures as the exigency of the case may require.

The practitioner must recollect that in twin labors, one placenta may be common to both children, or, there may be a placenta to each child, but connected with each other marginally; and, an improper management of either of these conditions may occasion dangerous hemorrhage. No attempts at removing the placenta of the first child should be made previous to the delivery of the second, as uncontrollable hemorrhage might thereby be excited. And, after the expulsion of the second child, a much longer interval than in ordinary cases must be allowed for the delivery of the placenta (unless the presence of hemorrhage renders its prompt removal necessary), as the uterus being somewhat enfeebled or exhausted, does not so readily renew its contractions as in single labors. The removal of the placentæ must never be effected by forcible traction upon the cord, but by arousing and securing permanent uterine contractions, using frictions and compressions externally, and making slight tractions upon the cord, as heretofore recommended in single labors.

In hemorrhages, after the birth of the last child, the hand will require to be introduced within the uterine cavity, in order to detach and remove the placentæ; and it should not be withdrawn, until a perfect separation of both has been accomplished—and even then, not until uterine action has been aroused sufficiently to induce due and permanent contractions of the organ. After the placentæ have been removed, their uterine surfaces should invariably be examined, to ascertain whether any part has been left behind within the uterus.

In cases where a premature labor has been induced by the presence of twins within the uterine cavity, and the first child has been expelled, the recommendations to rupture the membranes, or in any way hasten the delivery of the second, is exceedingly unwise and improper; this recommendation is only applicable at full term. After the escape of

the first child, should the uterus cease any further action, the second remaining one may be matured by a further continuance of the pregnancy, and this result should always be favored by non-interference, unless accidents occur threatening the mother's life, and rendering it imperative to empty the uterus of its contents.

After the expulsion of the placenta, the bandage should be firmly applied around the abdomen, with a compress over the uterine tumor, to secure its permanent contraction, and prevent any tendency to hemorrhage; and as the shock to the nervous system is usually much more severe than in natural labors, the patient must be kept quiet, the presence of company rigidly prohibited, and stimulants, antispasmodics, or anodynes, administered according to the indications. Uterine hemorrhage should always be closely watched for, and every means be employed to guard against it. And the accoucheur should not leave his patient until, by feeling through the abdominal wall, he has found the uterus about the size of a fetal head and firmly contracted.

Where three or more children are present, they will require to be managed in accordance with the above rules, recollecting that the labor will generally proceed slowly, but that the dilatation of the soft parts will not be so extensive, nor the sufferings to the mother so great as in labors of one or two children, from the fact that triplets and quadruplets are usually very small. Hemorrhage, however, is always to be suspected.

In plural births, every variety of presentation may occur; thus, the head of the first child, and the breech of the second, which are favorable positions; the head of each may present; the breech or shoulder of one, and the head of the other; each child may present by a shoulder; together with other varieties, rendering it highly necessary for the accoucheur to be conversant with the modes of diagnosing each and all of them. Cazeaux observes: "Pleissman states that, on one occasion, he found the orifice plugged up by the parts that had become engaged, and which at first sight appeared to him to be a *quantity* of hands and feet. A more careful examination enabled him to distinguish four inferior extremities, which were delivered as far as the hand, and one arm.

"At first," he says, "I was in great perplexity, because I could find no way of introducing my hand into the womb, for the purpose of distinguishing and seizing the two feet belonging to each child, and because all my efforts to make even one of these extremities go back

again, proved abortive; beside which, in drawing on any two of them, I might confound and bring down the feet of two different fetuses at the same time; and lastly, even if I succeeded in seizing the two feet belonging to the same infant, I might, by drawing on them, engage the other parts, and thus augment the difficulties. Being greatly embarrassed as to the proper course, and yet obliged to act, the employment of a measure recommended by Hippocrates, under different circumstances, happily suggested itself; that was, to suspend the patient by her feet, hoping that the heads and the trunks of the children would, by their weight, draw one or more of the extremities toward the fundus of the womb, which was still distended by the waters. The husband and brother-in-law of the woman passed their arms under her hams, and thus held her suspended, so that only the head and shoulders rested on the bolster. I intended, as soon as I mounted on the bed, to press back one or more of the free extremities into the womb, but two had already returned from the mere position of the mother, and the other three soon followed by the aid of my fingers. Immediately afterward, I was enabled to introduce my hand into the uterus, and to withdraw successively therefrom three children by the feet.' In bringing forward this case, I only desire to illustrate what has been said concerning the difficulty of diagnosis. I ought also to allude to the impossibility of the reduction, and the singular procedure resorted to, with a success that seems to warrant its employment again under similar circumstances."

Ramsbotham detected, by the direction of the toes, that two feet presenting at the vulva, a right and left, belonged to different bodies; he terminated the labor by making careful traction at one leg, and gently pushing up the other, extricating each breech from the pelvic brim, and the children were born living. Such cases, as before observed, occur when the children are in one sac, or when the sac of each ruptures before the child is expelled.

The most difficult complication of presentation is where, as the first child descends, with the pelvic extremity first, its chin becomes locked under the chin of the other, which was presenting the head, and which had passed into the pelvic cavity. In this case only one child can be saved; the child which has descended must be eviscerated and detruncated, leaving its head in the uterine cavity; this must be pushed up above the superior strait, the second child brought down and delivered, and finally the head of the first must be removed.

The fetus is subject to various diseases, and to excessive development, or perversion of parts, while within the uterus, which may form **MONSTERS** or **MONSTROSITIES**, and which frequently exert an unfavorable influence upon the parturition. The difficulty in these cases depends altogether upon the relative proportion between the fetus and the pelvis; if the child be small, there will be no delay or trouble in its passage through the pelvis; if it be large, from excessive development, or from a union of two fetuses in one, the labor will be difficult and preternatural according to the disproportion existing and other circumstances which may offer.

Hydrocephalus, ascites, and distension of the abdomen with wind, or water, are the most common diseases incident to the fetus which render labor difficult; these have already been treated upon.

Monsters are occasionally met with in practice, and mainly belong to one of the following classes, viz.: 1. Monstrosity from deficiency of certain parts of the body, as, in anopses, where the eye and orbit are wanting; cyclopes, where there is but one eye, situated in the center of the forehead; acephalous, where the head is absent; anencephalous, where the head is present, but is devoid of brain, etc. 2. Double monstrosity, where two or more children become united together, as in cephalodymia, where the heads grow together; hepatodynia, where the livers are united; pelvidymia, where the pelvic extremities become fused, etc. 3. Monstrosity, or ectopy, in which one or several parts are abnormally situated. 4. Where clefts or fissures occur in parts which are united when in a normal condition. 5. Where there is an excess or disproportionate enlargement of certain parts. 6. Atresia, or where parts which are normally opened become closed. 7. Hermaphroditism, or vicious conformation of the genital organs. Various causes have been assigned for these monstrosities, among which the most probable are: 1. A primitive defect in the germs; 2. Accidental changes undergone by the fetus at some period of its intra-uterine life, effected by the imagination of the mother, injuries, an unhealthy condition of the mother, etc.

In an obstetrical point, the only instances which are of interest, from their sometimes creating a very painful and difficult delivery, are those belonging to the above 2d, 3d, and 5th, classification, the 2d, more especially; and when they do occur, it is almost impossible for an accoucheur to form a correct diagnosis. But even should he be able to detect a monstrosity, it does not follow that he should interfere, for the natural efforts are frequently adequate to the task of

terminating labor, and even without loss of the child's life, as for instance, in the cases of the Siamese twins, and Rita Christina.

Double monstrosity, or the adherence of two fetuses may be suspected only by evidence of a negative character. "If two bags of water are detected by the finger, if it is necessary to rupture the membranes twice, if the amniotic waters are discharged at two separate and distinct periods, the presence of independent twins in the womb may be regarded as certain; for there are never two envelopes for a double monster, and two perfect twins are very seldom shut up in the same amniotic pouch. Again, if two feet or even a single one descend with the head, more particularly if the feet yield to the tractions made on them, and appear at the vulva without the heads having a tendency to reascend, we may affirm there are two infants, because a monster is never composed of two individuals held together in such a way that the head of one is alongside the feet of the other; but if several limbs present simultaneously, we can only ascertain whether the children to which they respectively belong are joined together or are independent, by carrying the hand up into the womb." (*Cazeaux*.)

TREATMENT.—The management of monstrosities is similar to that heretofore named, in cases of difficult labor. A fair trial should always be accorded to the efforts of nature; if after having waited a sufficient length of time, say for twenty-four hours, during which time the pains have been strong and active, if delivery is not effected, means should then be adopted to expedite it. Or, should symptoms of exhaustion manifest themselves previous to this time, or hemorrhage, or other accidents, the accoucheur should at once interfere. No specific rule can, however, be given; the general principles of obstetrics must be the guide; the success attending the case will depend altogether upon the skill and judgment of the attendant, who will resort to the forceps, perforator, crotchet, etc., according to the peculiar circumstances of the case; and who should not hesitate to destroy or mutilate the child, if it become necessary, in order to insure the safety of the mother. In case of great pelvic deformity, the Cesarean operation may become necessary, but, with a normal pelvis, the deformity of the child must be very excessive, which should lead the practitioner to adopt this expedient for its removal.

When monsters live, and are capable of action as individuals, they have the same rights as other persons; and the destruction of a monster after birth, however great the deformity, is a criminal act, punishable as infanticide. This should not be forgotten, as I have heard of midwives who did not hesitate to destroy monsters as soon as born.

CHAPTER XXXVI.

COMPLICATED LABOR — UTERINE HEMORRHAGE FROM PLACENTA PRÆVIA—PUERPERAL HEMORRHAGE—PLACENTAL PRESENTATION.

ONE of the most common complications of labor, and at the same time the most alarming, is HEMORRHAGE or FLOODING. It attacks suddenly, progresses rapidly, and requires prompt and energetic treatment; equanimity, self-possession, caution, and a thorough familiarity with the appropriate remedial measures, are necessary requirements for success—without these the individual who attempts the practice of obstetrics is extremely culpable. No one can tell with certainty, in an early stage, whether hemorrhage will occur during any given labor; and it is not unfrequently the case, that it attacks suddenly and fatally in instances where least expected; no one can know at what moment he may be called to treat a formidable puerperal flooding—hence, the importance of holding the above requirements. A proper attention, may insure safety to two human beings, while an ignorant or ill-directed course, is almost certain to terminate fatally.

I have already referred to abortion and the hemorrhage which may be present in the early months of gestation, this may be, and is at times, very profuse, often resulting in the death of the patient. But the more fearful and perilous attacks of flooding are those which take place at the parturient period. These may be divided into four forms: 1st. That which occurs at an early period of labor from placental presentation. 2d. That which occurs during labor, previous to the birth of the child, but not dependent upon placenta prævia. 3d. That which occurs after the birth of the child, but previous to the expulsion of the placenta. 4th. That which takes place after the delivery of the placenta.

In 75,596 cases of labor, hemorrhage occurred 517 times, or about 1 in 146 $\frac{1}{4}$; out of 630 cases of hemorrhage, 111 mothers were lost, or about 1 in 5 $\frac{1}{2}$; out of 443 cases, 109 children were lost, or about 1 in 4. In accidental hemorrhage, 28 cases proved fatal out of 114, or nearly 1 in 4; in unavoidable hemorrhage, 51 cases proved fatal out of 182, or about 1 in 3 $\frac{1}{2}$; and in hemorrhage after delivery, 22 proved fatal out of 293 cases, or about 1 in 12. (*Churchill.*)

The placenta may vary in its point of attachment to the internal face of the uterus; thus, in one class of cases it may adhere to some portion of the fundus, in another, to a part of the body, and in others, to the inferior segment of the uterine body, partially or wholly over the inner os uteri, and hemorrhage to any great extent will not take place in either of these conditions, during gestation or parturition, unless the placenta be considerably separated from the uterine surface. A slight detachment may occasion a discharge of blood from some small blood-vessels which have become thereby exposed, but insufficient to create alarm, or amount to a flooding. It is only when the separation has, from any cause, become so extensive as to expose the patulous orifices of the large veins and arteries of the uterus, through which the utero-placental circulation has been carried on, that a quantity of blood escapes giving rise to puerperal uterine hemorrhage. And so long as these orifices remain open, whether from inertia of the uterus, or from the presence of a body within its cavity which prevents its perfect contraction and condensation, so long will the hemorrhage continue. It is only by the contraction of the muscular fibers of the uterus, that these orifices, as well as the caliber of the whole tract of the bleeding uterine vessels, become diminished to such an extent as to permanently arrest the flooding. And to adopt means for the purpose of effecting such uterine contraction is the duty of every accoucheur who treats puerperal hemorrhage.

HEMORRHAGE FROM PLACENTAL PRESENTATION, or PLACENTA PRÆVIA, in which the placenta is located "præ via" before the passage or way, is termed *unavoidable hemorrhage*; it is the most dangerous form, and the most difficult to manage. The placenta being attached, partially or completely, over the inner os uteri, to the lower segment of the uterine body, as the fibers of the cervical portion of the uterine body become more and more developed during the latter months of pregnancy, in order to enlarge the lower portion of the uterine cavity, the connection between the placenta and uterus becomes gradually separated, and the utero-placental vessels being thereby ruptured or lacerated, a discharge of blood follows, perhaps some from the placental surface, but chiefly from the uterine, proportionate to the extent of separation and size of the blood-vessels ruptured. And when this occurs during labor, the hemorrhage grows more excessive with the advance of the labor, as each uterine contraction effects an increase of separation. The placenta may be inserted

immediately over the inner os uteri, so that the centers of the two are in correspondence, when it is called complete placenta prævia, or *Placenta Centralis*; or it may vary in any degree between this central location and the insertion of its edge near the os internum uteri, when it is called partial placenta prævia, or *Placenta Lateralis*; the danger in these cases increases as the center of the placenta approaches that of the inner os uteri. The fact that the placenta may lie over the os uteri, was noticed by several of the older French writers, among whom may be named Guillemeau, Mauriceau, Amand, Astruc, and Dionis, as well as by others who have written since the middle of the eighteenth century. About the year 1728, Daventer called the attention of the profession in Holland to this matter, and some twenty-five years later, Bracken and Pugh brought the subject to the notice of the physicians of England.

Although these writers accurately described the condition of things at the period of labor, they all seem to have entertained the opinion that this malposition of the after-birth was owing to some accident which had dislocated it from its former connection with the fundus of the uterus, and that it had gravitated downward by its own weight, until it had become placed in its new position, covering more or less completely the orifice of the organ.

Such an opinion, however, does not obtain with the well-informed of the profession at the present day, all agreeing that, inasmuch as the chorion, the decidua, and the membranes, as well as the blood-vessels, both of the uterus and placenta, maintain the same relations to each other when the placenta is found in this position, as when in its normal location, that, from some unknown cause it must have been attached, *from the first*, in the lower part of the womb, and not have fallen from a former attachment.

As early as in 1730, Giffard published the opinion, that he had "good reasons to believe that the placenta sometimes adheres to, or near, the os internum, and that the opening of it occasions a separation of the blood-vessels, and consequently a flooding." A similar opinion was expressed by Heister, in 1739, who said "some moderns consider as a cause of hemorrhage, the adhesion of the placenta to the mouth of the womb; so that the more the os uteri is dilated, the greater is the separation of the placenta, and the more profuse the flooding." In 1761, Leveret, and in 1779, Smellie, expressed similar views, maintaining that the placenta was from the first over the os uteri, and that its being there was *not* the result of a detachment from

the fundus, and a dislocation of the organ. This opinion has universally prevailed among scientific men since that time, and now requires no additional proof to that furnished in abundance by practical men, both by reason and by observation. Dr. Rigby, of Norwich, England, however, was the first to call attention to parturient hemorrhage, and the importance of distinguishing its varieties, that the proper treatment might be pursued. Since which placenta prævia has received the closest attention of several eminent accoucheurs in Europe and the United States.

Instances of placental presentation have been met with, in which delivery has been safely accomplished by the natural powers without any hemorrhage whatever, but they are very rare, and are never to be anticipated. Most commonly, the first symptom of this presentation is a gush of blood occurring sometimes during the latter months of gestation, from the seventh month to full term. It is from this period that the cervical portion of the uterine body begins to rapidly develop itself; a detachment of the placenta ensues as the uterine fibers expand, and a discharge of blood follows, which is the first symptom observed. Dr. Barnes, of England, does not believe that the hemorrhage in these cases is owing to the separation of the placenta from the gradual development and expansion of the cervix, but to the growth of the placenta itself. He says: "The first detachment of placenta arises from an excess in rate of growth of the placenta over that of the cervix, a structure which was not designed for placental attachment, and which is not fitted to keep pace with the placenta. Hence loss of relation; hence the placenta shoots beyond its site, and hemorrhage results." I must confess, however, that I rather incline to the view which considers the flow at this period due to the more rapid development of the lower portion of the uterine body. The hemorrhage may be so sudden and copious, even at this first onset, as to prove nearly, if not quite fatal; more generally, however, its first manifestation is but slight, ceasing if the woman lies down and remains quiet. This early sanguineous flow, when slight and so easily checked, is looked upon by the patient as an accident depending, probably, upon some strain, exertion, etc., and after its cessation is no more thought of. In five or six days, a further detachment of the placenta is occasioned by the continued development of the cervical part of the uterine body, and a fresh discharge takes place, which is apt to be greater than before; and from time to time these attacks of bleeding occur, increasing in severity each time, until, if the woman reach her full term, she may be so com-

pletely exhausted and prostrated from loss of blood, as to be incapable of sustaining the loss of even a few ounces more. A woman who has not suffered from bleedings previous to term, and of strong constitution, is more likely to recover, uninjured, from a placenta prævia labor, than one the reverse. As regards the hemorrhage at full term, Dr. Barnes observes: "The mouth of the womb *must* open to give passage to the child. This opening, which implies retraction or shortening of the cervical zone, is incompatible with the preservation of the adhesion of the placenta within its scope. In every other part of the womb there is an easy relation between the contractile limits of the muscular structure and that of the cohering placenta. Within the cervical region this is lost. The diminution in surface of the uterine tissue is in excess."

The circumstances under which a vaginal examination must be made are, 1st, when the hemorrhage is copious and continued; 2d, when the patient has reached full term, or is within several days of it; and 3d, when uterine contractions manifest themselves, however slight they may be, or however distant the intervals between them.

DIAGNOSIS.—A placental presentation may be suspected when the first hemorrhage occurs suddenly [about the sixth or seventh month, and up to full term], and without any apparent cause, being renewed every week or two. If the placenta be situated upon the anterior part of the inferior segment of the uterus, it will prevent ballottement. At the period of labor placenta prævia may be suspected by the gush, or increased flooding during a pain, but which diminishes in the intervals. When it becomes necessary to make an examination per vaginam, we may then positively ascertain the nature of the case. I have just stated that an examination of this kind must be made when hemorrhage is copious and continued, and this observation applies to all hemorrhages taking place from the uterus during the latter months of pregnancy. In these cases we are not to wait for pains, nor be governed by them; for the probabilities are that the uterus has become so enfeebled or paralyzed from the large quantity of blood discharged that no pains will be felt—the organ is too weak to contract. Indeed, the absence or trifling character of pains during these hemorrhages is a most positive indication of the necessity for interference to learn the cause of the flooding, and to check it if possible.

In making the vaginal examination it is immaterial as to the position assumed by the patient, provided the fingers can be introduced. The first two fingers may be passed within the vagina, or, if

the os uteri be high up in the pelvis, it may become necessary to introduce the whole hand. The examination should be conducted with great care, for a quantity of coagula, will generally be found in the vagina, the separation or detachment of which will cause a return of the hemorrhage, or increase it in quantity. Neither should the finger be forced within the os uteri; if this be not sufficiently dilated to permit the entrance of the finger without difficulty, it would be better to wait until the flooding has caused sufficient dilatation or dilatability.

The placenta will be recognized by the soft, fleshy, fibrous, lobular sensation which it imparts to the finger, differing from a coagulum by being attached to the inner surface of the lower segment of the uterine body, and by not being readily perforated or broken down—a coagulum is loose, can be removed, and may be pierced by the finger and destroyed without any difficulty. As the examination will produce a discharge of blood, the practitioner must make it a positive one; he must not allow himself to mistake a clot, nor the cervix, for the placenta. The latter will have a thick, spongy feeling; the former is movable and readily broken down, which is not the case with the placenta. Sometimes the detached uterine surface of the placenta will be covered by a thick smooth layer of coagulated blood, which will prevent the finger from coming into direct contact with the placenta; but any error in diagnosis from this circumstance may always be avoided by carefully breaking down or detaching the coagulum. Whoever will carefully pass the point of his finger over the uterine surface of a recently expelled placenta, whenever the opportunity offers, will never confound a coagulum of blood, however firm, with a placenta inserted upon the lower segment of the uterine body. Repeated examinations in unavoidable hemorrhage are unnecessary and reprehensible; one, or two at most, are fully sufficient to ascertain the true state and condition of the parts, etc.

Having ascertained the presence of the placenta, the next inquiry will be, whether the presentation be complete or partial? If it be complete, no membranes can be felt; if partial, the edge of the placenta may be readily detected, together with the membranes passing off from it;—a portion of it may be felt closing a part of the inner os uteri, and through the membranes may, probably, be recognized the presenting part of the child. The finger may also be carefully carried around to ascertain where the placenta is free or detached, in a complete presentation, but no efforts should be made to separate it,

or to pass the finger between it and the inner surface of the uterus. Cazeaux gives the following rules for determining placenta prævia in certain cases: "When the hemorrhage takes place either in a woman with her first child, or at an early stage of the gestation, when, in a word, the cervix uteri is not sufficiently dilated to permit the introduction of a finger, we might still be enabled to determine the cause of the flooding by the following signs, namely:

"1. A hemorrhage caused by the placenta's insertion over the internal orifice never occurs before the end of the sixth month; and, very frequently, not until the last four or six weeks of gestation. Beside, it is highly probable that the period at which the flooding comes on, is usually subordinate to the greater or less extent of the placenta corresponding to the neck; that, in cases of insertion, center for center, it is manifested much sooner than where only one of its margins is in opposition with the orifice. Nevertheless, there are numerous exceptions to this (as M. Næëgle considers it) nearly general rule; for, in a large number of the cases of central insertion, the hemorrhage is not developed prior to the commencement of labor.

"2. It commences spontaneously, without an appreciable cause, and without any precursory phenomena; the woman being often suddenly aroused in the middle of the night by the blood escaping from the genital parts.

"3. When manifested for the first time, it is generally inconsiderable in amount and soon over; but, after having disappeared altogether, it returns, sometimes in the course of a few hours, at others, not for several days; and, at each reappearance, the discharge is a little more abundant, and, lasts somewhat longer.

"4. The cervix uteri (considering the period of gestation) is usually thicker, softer, and more spongy, because the placenta, by becoming fixed over this point, determines there a more considerable afflux of blood.

"5. If the labor has commenced, and the membranes are still intact, the flooding constantly augments during the uterine contractions, and diminishes in the intervals. But the contrary is observed when the discharge is occasioned by a separation of the placenta attached to any other point; for then the womb, by contracting, obliterates the vessels, either by a retraction of its own proper tissue, or by the compression they are subjected to from the parts inclosed within its cavity; but, in the case under consideration, the contractions that affect the dilatation of the cervix, destroy the vascular adhesions

which unite it to the placenta, more and more, and thus multiply the sources of hemorrhage. This sign is one of great value before the membranes are ruptured; but, after the waters are discharged, the child's head presses on the orifice during the contraction, and prevents the blood from escaping.

"6. The bag of waters does not form as in an ordinary labor; for the insertion of the placenta over the neck closes its orifice, and prevents the lower segment of the ovum from engaging therein, and from being accessible to the finger.

"7. Lastly; according to Dewees, the blood has a brighter color at the onset of the hemorrhage than when it comes from the fundus, and coagula never come away, excepting when the discharge has lasted for some time, or is on the point of disappearing."

The great mortality of placenta prævia to the mother, may be due to one or more of several causes, as, to the exhaustion from hemorrhage; to inflammation of the veins or metritis resulting from the effects of the lochia upon the greatly developed blood-vessels of the præ-cervical part of the uterus, or, from version, should this have been accomplished; to post partum hemorrhage; to rupture of the cervical tissue following version; or, to the shock occasioned by this operation. The child may die from even a small quantity of blood lost, but more generally from asphyxia arising from deficient æration of its blood.

CHAPTER XXXVII.

COMPLICATED LABOR—TREATMENT OF PLACENTA PRÆVIA— SYNCOPE FROM HEMORRHAGE.

TREATMENT.—The treatment of cases of placental presentation will depend much upon the period at which the practitioner is called, as well as upon the attending circumstances, and will also require upon his part promptness of action, rapid observation, calmness, and firmness. If called some weeks previous to full term, on the occurrence of the commencing floodings, and these are not very copious, the only measures required will be to keep the patient in a horizontal

situation, on a hard bed and in a cool room, enjoining rest and perfect quiet; and, as in all cases of uterine hemorrhage, the bed should be placed so that the attendants can easily pass around it: internally, cold and acid drinks may be exhibited, and some cold astringent solution may be injected into the vagina, but great care is necessary, as these local applications are very apt to arouse uterine contractions. The covering should be light, and the bowels must be kept regular. In fulfilling this latter indication, care must be had not to effect active catharsis by internal agents, nor by stimulating enema, as these will have a tendency to increase or cause a return of the hemorrhage—a consequence of straining or tenesmus, which may produce a removal of the coagula which are covering the lacerated blood-vessels. An injection of cold water is probably the best agent which can be employed to free the rectum, and it should be repeated, according to circumstances, once or twice daily, or every other day. Not unfrequently there will be more or less nervous irritability, generally arising from an excited and alarmed condition of the mind. The practitioner should always endeavor to tranquilize any mental agitation which may be present; and, to allay the excited condition of the nervous system, Opium, or a pill of Opium, or the administration of Sp. Tr. Pulsatilla, may be found beneficial. The diet of the patient must consist of light, nutritious fluids, avoiding all stimulating agents of whatever character, and this should be persisted in as long as may be deemed proper or necessary.

The hemorrhage having ceased, it must be borne in mind that it is liable to return at any moment, and may prove to be very excessive and serious. Before leaving the house, therefore, full instructions should be given to the friends for its management during the accoucheur's absence, as for instance, the above measures. He should likewise strictly enjoin upon them to send for him instantly on its recurrence; and lest he may not be readily found, the services of another professional brother should be secured, in order that the female may not perish for want of proper attention. Beside, these measures show that the practitioner feels a deep interest for the welfare of his patient, secure her confidence as well as that of her friends, and add to his reputation. As soon as the causes of the hemorrhage are suspected, the friends of the patient should be informed, and the dangers to which she is exposed fully made known; but on no account should the patient be notified, lest it might hasten an unfavorable issue, by creating an intense nervous excitability with powerful mental agitation.

Should the hemorrhage be excessive, and resist the energetic measures employed to check it, or should uterine contractions, however feeble, be experienced, with even moderate loss of blood, the practitioner should *apply ligatures to the inferior extremities*, and then proceed to a vaginal examination, as heretofore explained. If the os uteri be found rigid, resisting the introduction of a finger, no force whatever must be employed; the os uteri *must be soft and yielding, in all cases*, before any introduction of a finger or of the hand is to be attempted—to do otherwise is unpardonable. There may be cases, where the hemorrhage is very copious, with a rigid and unyielding condition of the parts forbidding the introduction of a finger for diagnosing, or of a hand for version, in which this rule may be violated, for the purpose of endeavoring to afford the patient the only chance for safety; but it is always hazardous, and most frequently terminates fatally. Generally, however, the rigidity of the os uteri will be speedily overcome by the great loss of blood; if not, Gelsemium, Lobelia, or the compound tincture of Lobelia and Capsicum may be given.

In placenta prævia, the danger is from hemorrhage, which increases when uterine contractions come on, or when dilatation of the os uteri is progressing; and the great and important question is, when to deliver? The established, and probably the safest method of delivery is, by turning and promptly bringing away the child. The operation has its dangers, but it is the best which can be pursued, and its success will depend greatly upon the skill and judgment of the accoucheur. If he waits for the complete dilatation of the os uteri before undertaking the operation, the exhaustion effected may be so great as to afford no hope for the patient's survival, or she may perish before such dilatation is effected. I would repeat, therefore, two great principles by which all medical men must be guided in their management of placenta prævia: 1, never attempt to pass the hand within the os uteri when it is in a rigid condition; 2, never delay interference by version or otherwise, until full dilatation of the cervical orifice has been accomplished.

The time for operation has arrived, when the os uteri, being soft and yielding, has dilated to the size of a half dollar, or sufficient to easily admit the introduction of the points of the fingers and thumb; to wait for a greater enlargement of the orifice, would be to increase the hazards to the patient, because the hemorrhage becomes more and more copious and alarming as the development of the os continues to advance; to interfere sooner, would be at the risk of effecting considerable

injury to the os uteri.—It is in cases of an insufficient degree of dilatability of the os, that Barnes' colpeurynter, or Molesworth's climax dilator, is used, to effect the requisite amount of dilatation, as well as to arrest the hemorrhage, previous to introducing the hand for turning.

The requisite amount of dilatation having been accomplished, the female should be placed upon her back; or if the hemorrhage be excessive, or she be very much exhausted, she must not be moved, but the version must be effected while she is lying on her left side. It is always advisable to relieve the ruptured vessels from blood pressure, by ligating both limbs high up around the thighs, which by retaining the blood in the extremities, serves as a reserve that may be again admitted into the general circulation as soon as the immediate danger has passed. The pelvic extremity of the patient should, if possible, be considerably elevated above the head, so that the body shall lie in an inclined position, the head being the lowest part, and this may readily be effected by lifting up the bedstead and securing the legs of one end on blocks of sufficient height: this measure may preserve her from a fatal syncope. The operator must remove his coat, bare his arm, and having anointed the arm and fingers, proceed to the introduction of the hand into the vagina.

Before introducing the hand, however, it is of some importance to ascertain the position of the child; for should the wrong hand be employed at first, its removal will produce an increase of the flooding, and which may involve fatal consequences before the other hand can be entered. If the placenta be only partially attached over the inner os uteri, or if one side of it be wholly detached, the finger may be passed between the free end of the placenta and the uterus until it reaches the membranes, when the position may be ascertained through these; or if this can not be done, and the patient be not too corpulent, an external examination over the abdomen, in the absence of pains, may detect the globular head at the lower portion of the belly, and the curve of the child's spine being found on the right or left side, will determine its position. This can not, however, be easily ascertained in all cases, and the practitioner will then employ his left hand, on the presumption that the head is in the most usual position, or that in which the occiput looks toward the left acetabulum.

“In every case, before attempting to turn, make a most careful examination of the os uteri, and endeavor, from the degree of dilatation, and the thinness and softness of the orifice, to form a correct judgment upon its dilatability before interfering; for if your attempt

be unsuccessful, the hemorrhage will be renewed, and the patient will be placed in a worse condition than she was before." (*Lee.*)

The fingers and hand are to be slowly and carefully passed within the vagina, in a conical form, as heretofore explained, and carried up to the os uteri. As the fingers are insinuated within the os uteri, they should also gently dilate it, advancing upward between the free or detached side of the placenta (which must be detected by a careful exploration, as already referred to) and the inner surface of the uterus. If the placenta be not sufficiently separated to admit of the entrance of the hand, an artificial separation must be cautiously effected, selecting, when possible, that side of the placenta for the detachment which is ascertained to be the thinnest, which will be the nearest to its edge, and where, consequently, the uterine blood-vessels will be the smallest. As soon as the fingers have entered the os uteri, a greater or less discharge of blood will almost always follow, but at which the practitioner must not be alarmed; firmness, self-possession, and gentleness are required; and should the practitioner, alarmed at the fresh discharge, attempt the withdrawal of his hand at this time, a fatal increase of it would very probably be the result. As soon as the hand has thoroughly entered the uterine cavity, the wrist or arm prevents any further material loss of blood, by compressing the orifices of the bleeding vessels.

The hand should be passed as high up between the uterus and membranes as possible—these should then be ruptured—the hand carried within, and the feet of the child be obtained. If both feet can not be readily found, the version may be effected by one only, instead of delaying the delivery by a prolonged search for the other. The version should be carefully effected, but with as much expedition as is consistent with the safety of the child and patient, and the limbs should be brought down into the vagina until the hips or body of the infant is in contact with the uterine cervix; and this is to be performed, not only to facilitate delivery, but that the compression of the bleeding vessels by the fetal pelvic region may check any excessive hemorrhage. After the hand has been introduced within the uterus, and the placenta has been detached, if the practitioner withdraws it without effecting version, fatal hemorrhage may immediately ensue. Therefore, in all instances, where it is desired to detach the placenta wholly or partially, without turning the child, the whole hand, or even the greater part of it, should never be passed within the uterine cavity.

A sudden removal of the contents of the uterus might give rise to inertia of the organ and fatal flooding; therefore, unless the copiousness of the discharge requires the immediate delivery of the child, this must not be effected. The uterus must not be emptied too rapidly. And in every case of hemorrhage from placental presentation, as soon as the version is completed, a full dose of Ergot, should be administered, not so much for the purpose of aiding in the expulsion of the child, as to secure permanent contractions of the uterus subsequently. For it must be remembered, that the life of the patient depends entirely upon perfect and persistent uterine contractions. Beside the Ergot, frictions, and other means which have been heretofore spoken of, to arouse or preserve the action of the uterus, may be employed. The bandage should never be omitted.

Some writers recommend the perforation of the placenta itself, but this is a very difficult operation, and when accomplished, may effect the death of the child and mother from augmented hemorrhage occasioned by the certain rupture of large blood-vessels, or from a delay or difficulty in the passage of the child through the insufficient opening made by the hand. It should never be attempted.

The practitioner may, however, be called to a case of this complication, where the hemorrhage is copious and frightful, before the os uteri is sufficiently dilated, and in which delay would be death. If the os uteri be found rigid and unyielding, no attempts at forcibly entering it with the hand are justifiable—such attempts are always dangerous. The only course to be pursued is to procure, if possible, a diminution of the discharge, until the os uteri is in a more favorable state. For this purpose, ligatures should be applied to the extremities, the patient should be kept quiet in a recumbent position with the hips slightly elevated. Cold, acidulated, or astringent draughts should be administered internally, as well as heart-sedatives, and the vagina may likewise be plugged with a tampon wet with a solution of Alum, or dilute Perchloride of Iron, and which will occasionally be found useful. In the early part of this work I stated that the tampon was not to be used in hemorrhages from the uterus, occurring after the fifth or sixth month. The present instance may, however, be considered an exception, as there can not be a concealed hemorrhage to any great extent so long as the membranes remain entire, and the cavity of the uterus is not in a condition to receive a large amount of blood, except such as may pass between the inferior part of the membranes and the cervix, unless, indeed, the organ be in a very lax

condition with great prostration of the vital forces. Beside, the use of the tampon does not dispense with the careful watching of the patient, observing the features, the pulse, etc. When no unfavorable symptoms follow the employment of the tampon, its removal will be indicated by the strength and frequency of the pains. I do not recommend the use of the tampon in partial placental presentation, but only in those instances where the membranes can not be reached on account of the internal orifice being wholly occupied by the after-birth. In many instances, notwithstanding the use of all the above measures, the flooding will continue unrestrained; it then becomes necessary to hasten the delivery by all possible means. Should the rigidity be subdued by the great relaxation produced by the excessive loss of blood, or by the means employed for this purpose, then the following course may be attempted:

But if, instead of a rigid condition of the os uteri, a soft, dilatable one be found, however small the opening, the hemorrhage being, as above remarked, frightful, the fingers may be carefully entered within the orifice one by one, gradually dilating it as they proceed, until the hand can be so far introduced as to effect the version. This is not a desirable method, neither is it of easy performance, and being always, more or less hazardous, should never be undertaken except under imperative circumstances; it then becomes the best and only course left us, and should be employed with all the precautions which a knowledge of its disadvantages and dangers would suggest. In these frightful cases a delay may be fraught with fatal results. "As a principle, delivery had better be had recourse to an hour too soon than an hour too late." "It is the loss of the last half pint of blood that kills the patient." "Sometimes, when in these cases, it is impossible to pass the whole hand through the os uteri, the delivery may be safely accomplished by merely passing one hand into the vagina, and afterward the fore and middle fingers between the uterus and detached portion of the placenta, grasping with them the feet, which are generally situated near the os uteri, and drawing down the inferior extremities into the vagina and delivering." (*Lee.*)

In these cases, the physician should always have his forceps at hand, in order to extract the head, should any delay or difficulty occur in its delivery.

I will observe here that I have known of three cases of placenta prævia, in which the delivery was successfully and safely effected, by the accoucheur carefully inserting a finger within the os uteri and

detaching enough of the placenta to enable him to elevate the child and pass the detached portion upwards along the side of the head. The head descended into the brim, hemorrhage ceased, and the placenta was safely delivered after the child. In dangerous cases, with exhaustion that would imperil the patient's life from the shock of turning, also where the child is dead, it has been advised to detach the placenta completely and then leave the case to nature. It is stated that the hemorrhage ceases after the detachment, and the chances for both mother and child are much more favorable than by any other method.

When the placental presentation is **PARTIAL** or **INCOMPLETE**, that is, when its edge extends only to the margin of the inner os uteri, or perhaps, covering one-third, one-half, or any other proportion of this orifice, the remaining part presenting the membranes, symptoms of a character similar to those in complete placenta prævia will be met with, requiring a somewhat analogous treatment. This form of placental presentation is of more frequent occurrence than the complete.

When labor is on, and the hemorrhage is profuse, the best course is, to rupture the membranes, without regard to the extent of dilatation of the os uteri, which, by allowing the liquor amnii to escape, will permit the head or breech, as the presenting part may be, to descend and compress the bleeding orifices, thereby checking or diminishing the flooding. The head having descended, the forceps may be applied, if necessary, and the delivery hastily terminated. At the same time, the tincture of Gelsemium may be exhibited to forward the dilatation of the os uteri, while the bandage may be applied, and other means used to cause vigorous uterine contractions; and at the proper period Ergot may be given to facilitate the expulsive process, but this drug must not be administered when the natural efforts are all-sufficient, except it be for the purpose of securing permanent contractions after the delivery.

Should this course fail, the hemorrhage continuing, or, should there be exhaustion of the system, from the amount of blood lost, the better plan will be to rupture the membranes and turn; being governed by the rules already laid down for version in complete placental presentation.

In case the liquor amnii has been discharged, and version is desirable, the hand will find but little difficulty in entering within the uterine cavity, because the excessive flooding will, very likely, effect a lax, yielding condition of the parietes of the organ; this is unlike

preternatural presentations, in which a loss of the amniotic fluid is followed by energetic contractions, rendering it almost impossible to introduce the hand for the operation of turning. Beside, in placenta prævia, should the contractions be sufficiently vigorous to advance the head, the pressure made by it on the orifices of the vessels will diminish the flow, and there will then be no necessity for the introduction of the hand, as the delivery will be effected by the natural powers, except indeed, the pelvis be malformed, or the soft parts be rigid and unyielding.

In preternatural presentations of the fetus, with placenta prævia, or in a small or deformed pelvis, it will be proper to turn, provided the hand can be introduced for the purpose—and, in the latter instance, when the head can not descend, or pass through the cavity and inferior strait, it will require the use of the perforator to terminate delivery.

A brief synopsis of the treatment that has been advised in placenta prævia may prove useful: When copious hemorrhage is present at full term, the woman's strength good; the os uteri dilatable; the pelvis normal; the child alive; if the patient be multiparous, *version*, or the *forceps*, without delay; if primiparous, complete separation of placenta, or version. If the child be dead; os uteri rigid; patient exhausted; pelvis abnormal; previous to full term; partially or wholly detach placenta, and, if necessary, apply Perchloride of Iron or other styptic. If the patient be exhausted give stimulants. It is in cases of rigidity, and where the os is not sufficiently dilated, that the colpeurynter, or Molesworth's climax dilator, may be used to overcome the rigidity, or to soften and dilate the os, and check the hemorrhage. In the absence of these, introduce the speculum and plug up the vagina with absorbent cotton, soft sponge, lint, tow, strips of old muslin, or such non-irritating material as heretofore recommended in using a tampon. The first portion should be thoroughly moistened with a solution of Alum, Tannic Acid, or Perchloride of Iron. The tampon should be kept in place or renewed until the condition of the parts are sufficiently dilated to permit the accoucheur to deliver. It is advised, when it becomes necessary to turn before the position has been ascertained, that the practitioner proceed on the supposition that the child's head is in the left occipito-anterior position, and that, consequently, he employs the left hand, passing it up, in *partial* placental prævia, through that portion of the membranes that can be felt; in *complete*, pass it between the placenta and uterine surface, detaching the cake as the hand is carried along.

The treatment after delivery will be in accordance with the rules hereafter given, endeavoring to produce persistent uterine contractions which will prevent a return of hemorrhage—also to sustain strength, and allay the irritable condition of the system.

In hemorrhage from placental presentation, as well as in all puerperal hemorrhages, there is one very important symptom to which the attention must be especially directed—I mean **SYNCOPE**, or a state approaching to it. When the female has lost a large amount of blood the practitioner will probably find her pale, cold, and gasping, the uterus torpid and exceedingly flabby, the pulse nearly gone, with a fluttering of the heart, and a greater or less degree of insensibility. Upon an examination the flow of blood will be found suspended; but in making the examination, when the above symptoms are present, the greatest care must be had not to disturb the patient, nor to pass the finger into the vagina—it must be ascertained from the appearance of fresh cloths applied to the external parts. In such cases, the patient must not be moved—a change of position frequently results fatally; neither must any manual operations be performed for the purpose of emptying the uterus or otherwise endeavoring to promote its contractions. Should the patient be not altogether insensible, she will manifest an intolerable restlessness of disposition, a desire to change her posture, which, if acceded to, will occasion sudden death. If the hand be introduced within the uterus, for any purpose whatever, a disturbance of the coagula will immediately renew the flooding, and sudden death will almost certainly take place. It has been observed that when the female lies on her left side, the tendency to syncope is very much lessened.

Instead, therefore, of rendering useless attempts at any manual operations, the practitioner should keep his patient with her hips elevated somewhat higher than her head, and then employ measures to rouse the sinking system, and sustain her strength, until she has so far recovered that attempts may be made to empty the uterine cavity, if necessary. And, to accomplish this indication, stimulants must be given. Brandy, Rum, Ether, Ammonia, or other stimulants may be administered. And if these be conjoined with Sulphate of Quinia, the results will generally follow more promptly and continue more persistently. If the spirituous preparations be used, it is better to give them undiluted, if the patient can bear it, because it will require a less amount of fluid to be

thrown into the stomach, and this organ will be less likely to reject it. These stimulants must be persevered in, until they have exerted a decided, but not too highly stimulating, influence upon the system, as manifested by an increase of the pulse, an augmentation of the temperature of the extremities, a reddening of the lips, and a return to consciousness; and when these symptoms present, the further exhibition of stimuli may be dispensed with. In cases of this character the stomach will be nearly as insensible as the rest of the system, and will not be so readily acted on by these cordials as when in a more healthy and vigorous condition; one or two fluid ounces of undiluted Brandy may be given at a dose, and repeated every five, ten, or twenty minutes, according to the degree of depression of the vital powers. In extreme prostration it may be necessary to administer stimulants hypodermically. If too long continued, the stimulation of the vital powers by spirituous liquids may be followed by a greater and more dangerous prostration of both mind and body; on which account it is decidedly better, after their influence has become manifested, to omit them, and give other stimulants, as Carbonate of Ammonia; a mixture of Sulphate of Quinia and Capsicum; Cinnamon, etc.; by this means they can, if required, be again resorted to with much better effect. I succeeded in rallying one case, seemingly from the throes of death, by the use of the hundredth of a grain of Digitalin, administered hypodermically, and repeated in twenty minutes; after the second dose the patient had sufficiently reacted to partake of alcoholic stimulants.

But, not unfrequently, with the fainting or syncope, there may be a continued flow of blood; this is a very serious condition, especially if the female be sinking rapidly. Under these circumstances, the object will be to suppress, if possible, the hemorrhage, and for which it is difficult to give any specific rule. The rupture of the membranes, followed by a discharge of the liquor amnii, or the removal of the fetus, or the delivery of the placenta, may either of them be followed by contractions of the uterus, and a consequent suppression of the flooding, and thereby prove the safest course to adopt; while, on the other hand, and particularly if the female be much exhausted by the drain from the system, and the syncope be long continued or extreme, the wiser course will probably be to refrain from all operations, trusting to the natural resources, aided by the general external and internal measures usually employed in severe hemorrhages, without any disturbance of the patient's position.

CHAPTER XXXVIII.

COMPLICATED LABOR — ACCIDENTAL HEMORRHAGE — CONCEALED
HEMORRHAGE—HEMORRHAGE AFTER PLACENTAL DELIVERY
—EFFECTS OF LOSS OF BLOOD.

THE SECOND FORM of puerperal hemorrhage is that which occurs in the latter weeks of pregnancy, as well as during labor, in which the placenta is not attached over the inner os uteri, but to some other portion of the uterine parietes. It includes hemorrhages at any stage of labor previous to the birth of the child ; as, before the rupture of the membranes, after the evacuation of the amniotic fluid, after the expulsion of the head, and during the presence of the shoulders in the pelvic cavity. It has been termed *accidental* or *concealed* hemorrhage.

The immediate cause of this kind of hemorrhage is the separation of a part or the whole of the placenta from the uterus, and which may be the result of severe or sudden shocks, as blows, falls, undue pressure over the hypogastrium, mental agitation, excessive laughter, straining at stool, railroad traveling, etc. ; more commonly, it is owing to some internal cause, as shortness of the umbilical cord from surrounding the child's neck or body, abnormal condition of the placenta, etc. Occasionally it takes place without any discoverable cause. A discharge of blood may also take place from rupture of one or more vessels of the umbilical cord, but this is of rare occurrence.

More commonly, accidental hemorrhage is not observed until after the commencement of labor ; but it frequently happens that there may be one or more discharges of blood for some weeks previously. These early discharges may determine the character of the difficulty, and its disconnection with placenta prævia, by observing that, in almost all instances, they have been preceded by some sudden or unusual shock, while in placental presentation, the flooding occurs suddenly without any previous excitement or injury, and frequently happens during sleep.

The hemorrhage may immediately manifest itself upon the presence of the exciting cause, or it may not appear for a greater or less time subsequently, being preceded by uneasy sensations, and an aching and dull pain in the back and abdomen. Its quantity may vary from a few ounces to an amount sufficient to speedily destroy life, being generally proportioned to the extent of surface exposed ; but, very frequently, fatal flooding occurs where the exposed space scarcely exceeds an inch

square. And it may, or may not, be accompanied by labor-pains, depending, however, upon the period of gestation when it happens; but should this be at full term, and the pains present, the hemorrhage will be checked while they are on, but will return again during the intervals between them.

It must be recollected that, there may be a very serious hemorrhage going on internally, without the appearance of a single drop of blood externally, and if the practitioner is not aware of this fact he may lose his patient, even before he suspects the true state of her case. Therefore, we are never to judge of the condition of the patient by the amount of blood which has been discharged externally—and this rule will hold good in all puerperal hemorrhages—but, by the general symptoms of exhaustion, as rigors, weight or sudden distension of the uterus, faintness, nausea, vomiting, coldness of the extremities, feeble but rapid pulse, hurried breathing, paleness of countenance, sighing and yawning, and, if the discharge be not arrested, intolerable restlessness, dimness of sight, ringing in the ears, hiccough, and death preceded by syncope or convulsions; and these symptoms may be present when the vaginal discharge is so slight as hardly to attract any notice. Usually, when syncope occurs, it is followed by a suspension of the hemorrhage, which re-appears as often as the patient becomes conscious, and thus syncope and hemorrhage may continue to alternate with each other, until the fatal moment arrives.

DIAGNOSIS.—In all cases of puerperal hemorrhage occurring previous to the birth of the child, it is an imperative duty on the part of the medical attendant to institute a careful examination per vaginam, in order to ascertain whether or not the placenta be completely or partially over the inner os uteri. Of course, if the hemorrhage should be present previous to the commencement of labor, the os uteri will be found undilated, and no information can be had by the examination. If, however, it happens at term, and especially if pains are, or have been recognized, the cervix will be found relaxed and yielding, a result caused by the hemorrhage, and we can usually introduce the finger within the os uteri so as to detect either the membranes or the placenta; this must always be done, even if the whole hand has to be passed into the vagina, in order to make a thorough and satisfactory diagnosis, in all cases where the least doubt exists. In the flooding under consideration, the finger will not find the placenta at any part of the os internum uteri; this latter will be free, its marginal circumference will be of the same thickness all round, and the membranes

only will be felt in contact with the point of the finger when this is advanced upward.

Beside this investigation, which should, as before remarked, always be made, there are several signs which will materially assist in the diagnosis. Thus, in accidental hemorrhage, some previous excitement or shock will generally have occurred; if the pains are on, the hemorrhage is arrested by them, but recurs during the intervals—in unavoidable hemorrhage the flow has presented itself at different periods during the last weeks of gestation, and when labor is on the discharge stops or slightly continues during the intervals, and is augmented by the pains.

TREATMENT.—The treatment of accidental hemorrhage will vary according to the quantity of blood lost, the period at which it occurs, and the condition of the os uteri. When it occurs previous to full term, labor-pains being absent, and no tendency to dilatation on the part of the os uteri, the hemorrhage not being so profuse as to impair the constitutional powers, we should endeavor by all means to stop it, and prevent if possible, its return.

The patient should be kept in a horizontal position, on a cool, hard bed; her covering should be light, and the surrounding temperature of the room should be considerably reduced. Cold water only should be allowed, or ice; or the water may be acidulated with mineral acids, which exert no injurious influence and are usually acceptable. Injections of cold water, and cold applications over the external organs will frequently prove advantageous, but these should not be used when the system has become excessively depressed. The plug or tampon, is advised by some writers, but I consider its use contraindicated after the seventh month, from the fact that an external flooding may be changed into an internal one. The patient must not be allowed to get up for any purpose whatever, and in the alvine evacuations, especially to lessen straining efforts, it will be better to aid by rectal enemata.

Should the flooding be very excessive, some of the means hereafter named, under the treatment of Hemorrhage after the delivery of the placenta, may be employed, as, ligating the limbs, tincture of Cinnamon, or its combinations, oil of Erigeron, Gallic acid, etc.

When, notwithstanding all our efforts to check the discharge, it still continues, we can not expect that pregnancy will persist to the full period, and the only course that can be pursued to permanently arrest the hemorrhage and lessen the dangers to the female, will be to effect

an evacuation of the uterine contents. The palliative measures will now be of no avail.

The proper course, then, will be to rupture the membranes, and favor the escape of the amniotic liquor, by holding up the child's head; the contractions of the uterus may be excited by the application of the bandage, by gentle pressure made around the os uteri with one or two fingers, and Ergot and stimulants may be advantageously exhibited. In these cases, the os uteri will most commonly be found soft and dilatable, but should it be rigid and undilated, the rupturing of the membranes should not be attempted until this condition is overcome, and which may be readily accomplished by the tincture of Gelseminum, tincture of Lobelia, or other means heretofore explained.

The discharge of the waters, and the employment of the measures named, will, in the majority of cases, cause the uterus to contract and speedily evacuate its contents, and which action is almost invariably accompanied with a cessation of the hemorrhage. True, the life of the child may be endangered, but this is never to be taken into account when the mother's life is at stake.

I am aware that several writers have objected to rupturing the membranes in these instances of flooding, but their objections appear to me very insufficient, and the testimony of many eminent accoucheurs, together with my own experience, justifies me in strongly recommending this method, instead of immediate delivery by turning; the hand should in no case be passed into the uterine cavity, unless the safety of the female imperatively demands it; and it must be borne in mind, that in cases of uterine hemorrhage, where the membranes are felt at the mouth of the uterus, turning is very seldom required though it is always necessary in complete placental presentation. Sometimes, after the membranes have been ruptured and the above means used to arouse uterine action, nothing will be accomplished, the hemorrhage will continue, and the treatment will fail to bring about the desired contractions; this, however, is not apt to occur, unless the attendant has too long delayed the operation, or, where the whole or nearly the whole of the placenta has become detached, and an excessive internal hemorrhage has consequently ensued. In these cases of failure it will become necessary to effect the delivery by turning, the employment of the forceps, or the perforator, as the exigencies of the case may demand. When a preternatural presentation is ascertained in these cases of hemorrhage, it then always becomes necessary to effect a version as speedily as possible, but not before the os uteri is in a proper state, leaving the subsequent delivery to the

natural powers when these are efficient. When the hemorrhage has occasioned great exhaustion of the system with syncope, the discharge being suspended, as heretofore observed, the practitioner must be extremely cautious how he attempts, or proceeds in, his manual operations.

Should there be any delay in the delivery of the placenta, it is generally better, in cases where the hemorrhage has been profuse, to extract it, in order to secure permanent contraction of the uterus and thereby lessen any tendency to a continuation of the flow, and every means and care must be employed to guard, not only against a return of the flooding, but also against an attack of inflammation. After the delivery, the female should be managed as hereafter advised.

The **THIRD DIVISION** of puerperal uterine hemorrhage, is that which occurs after the delivery of the child, but before the expulsion of the placenta; it is frequently met with in practice, and usually comes on suddenly and in excessive quantity, greatly alarming the patient and her friends. The cause of this flooding is, as in the previous ones, a more or less complete detachment of the placenta from the uterine walls, with inertia or inefficient action of the uterus. It may occur in instances where previous pains were feeble and with long intervals, as well as in cases where the labor had thus far been prompt and energetic; and it is frequently manifested even when the preceding stages of labor had been most prudently and skillfully managed. The recommendation, heretofore given, that after the birth of the child the accoucheur should ascertain whether the uterus is contracted or not, by placing his hand upon the abdomen of his patient and feeling through its parietes for that organ, is one which should never be omitted, a rigid observance of this rule will keep him thoroughly informed as to the condition of the gestating organ, so that he can always be ready for prompt measures whenever required.

In these instances of hemorrhage, shortly after the birth of the child, or, perhaps, immediately succeeding it, a profuse quantity of blood is suddenly and rapidly discharged, and the first indications which the practitioner receives of the danger, are the pallid countenance, and the rapid and feeble pulse of his patient, with syncope, or a state approaching to it. On placing his hand upon the abdomen, the womb will be felt soft and flabby, and perhaps, somewhat enlarged; in a state of contraction it always offers a firm, hard resistance when pressed upon. The female soon becomes utterly unconscious, even before complete syncope has ensued, being unable either to see or hear

anything around her, and if relief be not promptly given, the hemorrhage will speedily prove fatal.

TREATMENT.—In all cases of hemorrhage previous to the delivery of the placenta, there is but one course to pursue, and that is, to artificially separate and remove the placenta, and “no man is thoroughly prepared to undertake the charge of a common midwifery case, who would hesitate to pass his hand into the uterus and remove the placenta, whether adherent or detached,” in a dangerous flooding of this character; and, in my opinion, the sooner this operation is attempted the greater is the security afforded to the woman; do not wait for the hemorrhage to become profuse and exhausting before interference.

The suddenness and profuseness of the discharge may at first startle the young accoucheur—but he should not hesitate, and tamper with the case by endeavoring to extract the placenta with pulling up on the cord, because he may invert the uterus or else break the cord off in the neighborhood of the after-birth, in either case increasing the danger. It will be well, however, to make slight traction on the cord before resorting to more radical means, as it may be wholly or almost completely detached, and thus easily withdrawn. Neither should he attempt to overcome the hemorrhage by internal or external means alone—leaving the introduction of the hand as a *dernier resort*—because, in these cases, a few minutes are of immense value to the patient, and such delays are trifling with her life. If the practitioner becomes excessively alarmed, or loses his presence of mind, and feels a hesitancy as to the course he should pursue, he should not attempt interference, lest he might increase the hazards, but should at once send for counsel.

On the manifestation of the hemorrhage, he will immediately place a bandage around his patient's abdomen with a compress beneath it to make pressure upon the uterine fundus, and will have the whole firmly secured. Then removing his coat, and rolling up his sleeves, he will gently stretch the cord with his left hand, and following it as a guide, conduct his right hand to the placenta; if on entering the os uteri, this be found contracted, it may be sufficiently dilated as the fingers and hand pass through it. Upon reaching the placenta, the fingers should be extended to its circumference, and its adhering portion slowly and cautiously detached, being careful that the separation is complete before attempting its removal from the uterine cavity. After the placenta has been reached, the other hand should be placed externally upon the abdomen of the patient to support and steady the uterus, otherwise, it will be very apt to move about, and retard the operation. The operator must bear in mind that by following the cord he will reach the fetal surface of the placenta—and should he

become embarrassed by the membranes in his search for its periphery, the hand should be withdrawn to the cervix, placed against the uterine walls, and the fingers carefully passed along the placenta.

In separating the placenta from the uterus, the fingers must not be passed rudely or carelessly between the adhering surfaces, lest some portion of the uterine surface be injured by the nails, or otherwise; neither should the practitioner seize the free part of the placenta and draw it away, lest some of the unseparated placenta be torn off and left behind to continue the hemorrhage and render it fatal, or, at all events to decompose and ultimately to give rise to the usual symptoms of putrefactive absorption. But, he should press upon the placenta at its attached points, with the ends of his fingers, carefully pushing or pressing it off, as though he were removing the peel from a thin orange, without disturbing the inner tunic of the fruit or causing any of its juice to exude.

The placenta being detached, the uterus will commonly contract and expel it and the hand together; or the means heretofore advised for causing contractions may be employed. The hand must not be withdrawn, but must be expelled by the uterine contractions; and after the expulsion, contractions occurring, the hemorrhage will cease. However, should it still continue, it must be treated the same as flooding occurring after placental delivery.

The removal of the placenta is not, as a general thing, a difficult operation; sometimes, however, it may form a partial or complete morbid adhesion to the uterine parietes, when it must be detached according to the mode explained when treating of morbid placental adhesion. In all cases, after having removed the placenta, it should be carefully examined to ascertain whether any portion of it is left within the uterus, and if any considerable part of it be wanting, say, one-fourth, or one-third, the hand should be immediately re-introduced, to remove the disrupted part, provided the uterus has not in the meantime contracted around it.

It may be necessary to again advert to a rule which should not be disregarded; which is, that if the hemorrhage has been very great, causing excessive debility and syncope, an attempt at removing the placenta must not be made until the patient rallies a little; for if, during the state of syncope the flooding ceases, the introduction of the hand, by removing the clot formed, would cause a return of the discharge followed by almost certain death.

In this, as in all puerperal floodings, the patient must not be left too soon, the medical attendant should remain with her an hour or

two after the arrest of the discharge, for the purpose of knowing that the contraction of the uterus is permanent, and that there will be but little danger of a return of the flow, and which may generally be insured by a dose or two of Ergot, as soon as the placenta has passed away, together with a firm application of the bandage; and on leaving the house, he should, previously, give full instructions to the nurse, or some friend, how to proceed, in case of a return of the flooding. Measures should also be adopted to guard against an attack of inflammation.

The **FOURTH VARIETY** of uterine hemorrhage, is that which appears after the extrusion of the secundines; this may be external and apparent, or it may be internal and concealed. It is an extremely dangerous form of flooding, often manifests itself suddenly and unexpectedly, and is frequently very difficult to subdue. It is commonly owing to inertia, or want of contractions of the uterus, or perhaps the contractions, may be irregular and unequal; occasionally, it may be the result of rupture of the cervix, and will be severe and dangerous, in proportion to the extent of the rupture. A certain quantity of blood always escapes from the mouths of the uterine vessels, after delivery, without causing any alarming or serious consequences, especially, when the uterine tumor is found hard and firmly contracted; but when the system experiences the effects of the loss of blood, and the uterus is found soft, flabby, and uncontracted, the patient becomes exposed to great hazard. Among the causes which may induce inertia of the uterus, may be named, mental excitement, debility of the muscular fibers of the uterus after a labor aided by Ergot, high temperature of the room, reaction from the use of stimulants, a clot filling up the os uteri, constitutional or local incapability of muscular contraction, neglect of the bandage, meddlesome interference, etc. Women whose urine contains considerable albumen are likewise more liable to this variety of hemorrhage.

The hemorrhage may come on immediately after the expulsion of the secundines, even when the labor has been thus far favorable and without any untoward accidents; or, it may not appear for half an hour, or an hour after the delivery; and, sometimes, several hours or even days may intervene before the effusion is manifested. Usually, after the first gush of blood the patient faints, and the discharge becomes lessened or suspended; she rallies, the effusion returns, is again succeeded by fainting and a suspension of the flow, and in this manner the rallying, flooding, and fainting alternate, until the system

has become so exhausted that reaction is impossible, and death terminates the scene. Sometimes, the discharge will take place slowly, continuing for some time before the patient becomes completely lost in a fatal syncope. Again, the first gush is, occasionally, so great as to produce excessive prostration of the system, with syncope, from which the patient never rallies. The influence of the discharge upon the system, varies with different women; some may have but an inconsiderable degree of depression from an excessive flow, while others will be destroyed by the loss of from twelve to eighteen ounces. And the hemorrhage is not to be dreaded, therefore, so much from its quantity, as from its effects upon the constitution.

SYMPTOMS.—This form of hemorrhage usually comes on suddenly, presenting the symptoms common to copious effusions of blood. Generally, the first intimation the physician has of the danger, is an expression from the patient of excessive faintness: her countenance becomes pale, the breathing difficult and hurried, the extremities cold, with a cold perspiration on the face and forehead, and the pulse rapidly becomes small, quick, feeble, fluttering, indistinct, and perhaps entirely suspended for a few beats, accompanied with a state of unconsciousness, which often comes on in a few seconds. On examining the bed and napkins, a large quantity of blood will be found, perhaps so excessive as to find its way from the bed to the floor; or there may be a very small discharge externally, but a copious one internally.

If the first gush should not prove fatal, after a greater or less duration of the syncope, the pulse returns, gradually increasing in strength, the countenance becomes a little more florid, the extremities warmer, the breathing more natural, and the patient recovers her consciousness. If the system has been considerably depressed by the discharge, she now manifests much restlessness and uneasiness, throwing her arms about, gasping and crying for fresh air, to be fanned, etc., with anxious expressions and apprehensions of dying.

After the first rally, in a short time she sinks again under a return of the hemorrhage, from which she may again recover, and so alternate for several times in succession, until finally she complains of a tightness of the chest, a sense of suffocation, which may be followed by a few spasmodic struggles or convulsions, terminating in death. The fluttering, indistinct pulse, the pallid countenance, the hurried respiration, the intolerable restlessness, with rigors and vomiting, are indications of excessive depression of the physical powers, requiring prompt, energetic, and decisive measures, which must be

perseveringly persisted in until the patient either recovers, or sinks beyond mortal aid.

The hand being placed upon the abdomen, will, in case of internal hemorrhage, find the uterus soft and fluctuating, and of a size nearly equaling that previous to the delivery; and if pressure be made upon it, a gurgling sound will be heard, accompanied with a gush of blood, fluid or coagulated, from the vulva. When the flooding is external, an examination of the bed and napkins will give some idea of the copiousness of the discharge; and although the uterus will be found soft and flabby, it will not be so large as in the former case.

In these hemorrhages after delivery, the accoucheur should always ascertain two things: first, that the whole of the placenta has been abstracted, for a small portion retained within the uterus has frequently given rise to copious flooding; and when called in to a case as consulting or assisting physician, he should never forget to ask for the placenta, that he may examine it carefully: this should never be omitted, even though the attending physician should insist that it had been completely removed; for cases have occurred in which such assertions have been found erroneous—not intentionally, but from an insufficient or hasty attention to the matter. Secondly, ascertain that the uterus is not inverted, a condition which may be readily effected by traction upon the cord, or drawing down of the placenta, when the organ is in a relaxed and paralyzed condition; and the mode of ascertaining this will be explained under the head of Inverted Uterus.

TREATMENT.—The flooding which occurs at the parturient period is not owing to any increased or inordinate action of the heart and arteries, and is, therefore, a passive hemorrhage, being caused solely by the exposure and patulous condition of the orifices of the uterine blood-vessels, the result of placental separation and non-contraction of the uterus. The indications of treatment are, to arouse the contractions of the uterus, by which alone can we expect to suppress or check the hemorrhage, and, to support the strength of the patient.

If, upon examination, it be ascertained that a considerable portion of the placenta has been left within the uterine cavity, the hand must be immediately introduced, as heretofore stated, for the purpose of removing it; and, usually, the uterus will contract as soon as the removal is effected, thereby arresting any further flooding.

But the placenta may have been entirely removed, and still a profuse hemorrhage be present; the woman's safety, then, depends entirely

upon the induction of uterine contraction. The practitioner must proceed calmly, steadily, and energetically: a hesitation, a falter, a timidity, and above all, an inexcusable ignorance of his duties, are almost certain death to his patient. Everything around is calculated to unman him, if he has not previously instructed and prepared himself; the appalling discharge of blood—the sudden pallor of countenance, depression of pulse, and loss of consciousness—the intolerable and significant restlessness, gaspings for air, and heart-rending exclamations of anticipated death—together with the alarm, the agonizing anxiety, and hurried whisperings and questionings of friends, are but little conducive to assist him in tranquilizing his mind. But notwithstanding all these, he *must be* composed, positive, prompt, and firm—*must* subdue all his own feelings, for the safety of his patient; and without he is able to do all these, he is unfit for the responsible duties of an accoucheur.

The hand of the practitioner must be placed upon the abdomen of his patient, for the purpose of making firm and constant pressure over the fundus uteri, and the pressure may require to be continued for two or three hours, in which case an assistant may relieve the medical attendant by performing this manipulation, and which will always be found superior to a bandage: not only should the fundus be compressed, but it should be grasped, squeezed, kneaded by the hand, which will tend to arouse its contractions, as well as to prevent it from becoming filled and distended with blood and clots; and this should be continued, notwithstanding the patient may desire us to desist on account of the pain produced. The pressure or kneadings should never be so powerful as to indent, or cause a partial or complete inversion of the uterus. Stimulants should be freely given from the commencement of the hemorrhage, or sufficient to keep up the pulse,—for this purpose brandy will be found very efficient, or a mixture of brandy and Lloyd's Ergot, which at an early period may arouse uterine contractions, but which will be of no service when, from excessive loss of blood, there is also a corresponding loss of the absorbing powers. Sulphate of Quinia, given internally, or by subcutaneous injection, will frequently prove efficient when Ergot fails. The hypodermic injection of ten or fifteen drops of Lloyd's Ergot will, as a rule, stimulate the uterus to immediate and powerful contraction, and in extreme cases should be administered in this way. When the flooding has been arrested, a bandage and compress over the fundus may then be substituted.

If the hemorrhage still continues, in conjunction with the pressure, cold applications should be applied to the pelvis; thus, cold water, or a mixture of cold water and vinegar, should be poured upon the naked abdomen from a considerable height; and napkins may be dipped in the same, and then applied suddenly to the vulva, the thighs, and nates. And this treatment should be persevered in until the shock or succession of shocks arouses uterine action. **LIGATURES** should be applied around the thighs, in all cases, as early as possible. When the system becomes considerably depressed, some care will be required in the resort to the above cold applications, as their constant use, at this time, will be apt to cause injurious rather than beneficial results.

Injectons of Cold Water into the vagina, uterus, and rectum, and even the application of Ice within the uterus, have been advised, but I have never employed them: should I deem such means requisite at any time I should not hesitate to employ them.

Internally, Ergot is indicated, but it will frequently fail in effecting any beneficial result. I place great confidence in the exhibition of tincture of Cinnamon, which undoubtedly exerts an influence upon the uterus: it may be given in teaspoonful doses, in some sweetened water, and repeated every ten, thirty, or sixty minutes, according to the urgency of the case; or it may be beneficially combined with other agents, thus: Take of tincture of Cinnamon, tincture of Rhatany, oil of Turpentine, each, equal parts: mix together, and give from half a fluidrachm to a fluidrachm for a dose, in some convenient vehicle, and repeat as may be required. Or it may be combined with Tannic acid, tincture of Ergot, and Port Wine. But it must be recollected that, however valuable they may be in other cases, astringents are of but little value in these floodings, unless the contraction of the uterus is effected, and then they are not required. It is only in instances of moderate flooding where these agents are apparently beneficial.

The calcined Deer's Horn (See *American Dispensatory*) has been highly recommended in uterine hemorrhage by some of the older Eclectics; several report having always succeeded in arresting the discharge when other means have failed. I have not employed it in practice, having succeeded in these cases by the means above described. Yet its positive influence in checking hemorrhage has been frequently named to me by physicians who have used it, and whose statements are entitled to confidence; beside, I know of instances where it has been exhibited with success. It is generally administered in drachm doses, repeated every ten, twenty or thirty minutes; each dose may be added to about a gill of hot water. This

preparation is considered a powerful styptic, from the facility with which hemorrhages are checked by its internal use; yet, from its beneficial results in menorrhagia and uterine hemorrhage, it must undoubtedly exert a decided influence upon the uterus itself, independent of any styptic power it may possess.

Other agents have been advised, but I am not acquainted with any especial value they possess, for instance—a mixture of three parts of Alum, two of Capsicum, and one of Geranium, in doses of twenty grains every ten, twenty, or thirty minutes. Likewise, doses of Tannic acid, five grains mixed with half a grain or a grain of Opium, and repeated according to indications. It makes, however, but little matter what remedies be used, so that the most important indication be fulfilled—energetic and permanent uterine contractions.

Professor Meigs recommends the following course, in obstinate cases: “If the student should find the hemorrhage not to be stayed by his treatment, let him press his fingers, gathered into a cone, firmly down upon the aorta, near the umbilicus. If the patient should not be troubled with extraordinary obesity, he will be able to feel the throb of the aorta with the points of the fingers. Let him compress the tube according to his judgment, in such a way as to check the downward rush of the torrent. This will operate usefully in two ways—first, by lessening the force with which the blood reaches the bleeding orifices, which will then have an opportunity to close themselves, more or less completely; and second, by causing a greater determination of blood to the encephalon, whereby the tendency to deliquium will be lessened. Many lives have apparently been saved by thus compressing the aorta.” I have never tested this method, having generally succeeded in checking the hemorrhage by the means above named, yet I have no doubt of its efficacy in some cases, and can bring to mind instances in which it might have been the means of saving several valuable lives; however, I should not hesitate to adopt it when other means proved ineffectual, and would favorably recommend it to the attention of the student. Baudelocque, I think, advised a somewhat similar course.

The introduction of the hand within the uterine cavity, in hemorrhage after the delivery of the placenta, for the purpose of stimulating the uterus to act, was at one time thought to be a most injudicious procedure, but later experience shows it to be a valuable and efficient means in overcoming the trouble in many cases. The hand immersed in water as hot as can be borne, and then carried into the uterus, will often, from its reflex effect, produce marked uterine action. In Leishman's System of Midwifery, M. Evrat is cited, who

recommended the use of a peeled lemon, which he introduced into the cavity of the uterus and then squeezed, so as to project the acid juice upon the bleeding surface. A sponge wrung out of vinegar, and other astringents have, in the same way and for the same purpose, been introduced, and the effect of such applications has not unfrequently been to rouse the uterus from its dormant condition. It may, also, frequently be necessary to introduce the hand into the uterus for the removal of the coagula, which sometimes adhere so strongly to the inner uterine membrane as to oppose all natural efforts at expulsion, and by their presence keep up a greater or less amount of flooding, even though contractions may have been induced.

The coagulum formed within the uterine cavity, may usually be considered as a means adopted by nature to check the flooding, as well as to eventually stimulate the organ to contraction. In many instances, the introduction of the hand, with frictions internally and externally, and aided by Ergot, fail to arouse the activity of the uterus; it continues soft and flabby, and if the coagula are removed with the womb in this inert condition, it may be followed by a fatal increase of the hemorrhage. The safety of the woman, in such case, depends entirely upon the presence of the coagula, and its continuance until contractions are excited, when they will, as a general rule, be expelled without artificial aid. Again: should the uterus be suddenly aroused, as has been the case, and contract upon the hand within its cavity, the position of the accoucheur, as well as of his patient, will be, at least for a time, anything but agreeable—the hand being fastened within a firmly-contracted womb. An artificial removal of the clots, however, is advisable where there has been a failure of the other means employed, with considerable distension of the uterus, and symptoms indicative of a flow internally; here, the removal of the coagula, followed by active means to secure uterine contraction, will prove serviceable, but it should be undertaken with cautiousness and prudence, because, if we fail to induce the desired contractions, the consequences to the patient become more serious. A removal of the coagula may likewise be attempted in cases where the uterus is small, with contractions or a disposition to become firm, but where, notwithstanding, the flow of blood continues in great quantity; in these cases the clots are usually so firmly agglutinated to the inner walls of the uterus that the efforts of the organ can not expel them. Any great accumulation of coagula, however, will not be apt to take place, if strong pressure or kneading be applied over the fundus uteri by the hand, or by a properly adjusted compress and bandage: it is the neglect of this measure which fre-

quently occasions the difficulty. When the external hemorrhage has not been great, but the constitutional symptoms indicate the loss of much blood, and there is but little distension of the uterus, an examination may find the *vagina* filled with a coagulum, and this should be at once removed.

Dr. Rigby speaks favorably of applying the child to the mother's breast, in this variety of flooding; suckling frequently induces after-pains, and from the sympathy existing between the uterus and *mammæ*, it may be found an efficacious method of causing the uterus to contract: if the plan be tried, the mother should not be moved or disturbed in her position. Galvanism has been recommended by Dr. Radford, and there is no doubt but it will prove successful in many instances, provided the battery can be prepared and in readiness for immediate action.

Among other measures, recently advised in this dangerous complication of labor, may be named that of M. Dupierris, of Havana, and which he has successfully used in more than one hundred cases of uterine hemorrhage: he first removes the clots and other foreign bodies from the uterine cavity, and then slowly and carefully injects into this cavity a mixture composed of tincture of Iodine half a fluid-ounce, Iodide of Potassium ten grains, Distilled Water one fluidounce. He states that it promptly arrests the hemorrhage by arousing the uterus to contractions, seldom having to give a second injection; beside which, he has found this injection to be of great value in puerperal peritonitis.

A great deal of discussion, and, unfortunately, some of it of a personal character, has been carried on among the medical men of Great Britain, relative to the use of perchloride of iron in post-partum hemorrhage, many contending that it is a dangerous agent, while others equally as eminent in the profession deny this, and speak highly of its efficacy in their hands. It appears that perchloride of iron was first successfully used by the late Professor d'Outrepoint, of Wurzburg, some thirty years ago; recently the attention of the profession has been more directly called to it, from its strong recommendation by Dr. Barnes, of England. The objections to its use are, that it gives rise to violent after-pains, embolism, phlegmasia dolens, pyæmia, metritis, septicæmia, or peritonitis, and generally followed by death. Unless the fluid be forced into the abdominal cavity, or the clots formed by its constringing action be not removed from time to time, thus allowing them to remain and decompose in the uterine cavity, I can not comprehend how such serious effects can follow its employment except as mere coincidences—the contractions of the uterus which immediately follow its applica-

tion, and the closure of the mouths of the bleeding vessels, are certainly opposed to any supposition that such results are due to its use. The successful results following its employment that are recorded by some of the most skillful and eminent medical men in Europe and this country, certainly entitle it to a just and fair consideration.

This agent should only be used as a *dernier ressort*, when all the other means pursued have failed, and especially in those cases where the uterus contracts and relaxes alternately, and, if possible, it should not be delayed too long, but should be resorted to before the exhaustion becomes so great that the uterus is rendered incapable of responding to the stimulus. Immediately previous to injecting it, all clots or remaining portions of placenta structure should be carefully removed from the uterine cavity, to allow the agent to come in direct contact with the bleeding surface; and the extremity of the nozzle of the injecting tube should be passed up to the uterine fundus, the fluid being carefully and slowly injected, especially avoiding the injection of air at the same time. It has likewise been used by swabbing out the uterine cavity with a small brush moistened with it, or by saturating soft, fine sponge with it, with which the uterine surface is swabbed,—allowing the sponge to be expelled by the contractions thus excited; a string may be attached to the lower extremity of the sponge, by which it may be withdrawn if desired.

A day or so after the cessation of the hemorrhage, and when any further danger from it has passed, the hard, black clots formed by the corrugating effects of the perchloride, should be removed from time to time in order to prevent any evil effects from their decomposition; and to assist in this prevention, solution of Permanganate of Potassa may be injected (or swabbed) three or four times a day into the uterine cavity, until all danger from septic absorption has passed. At the same time a proper sustaining treatment must be pursued. Secondary hemorrhage has in a few instances occurred some ten or twelve days after delivery, due to retained clots, etc., but which has been overcome by further injections of a strong solution of the perchloride. The strength of the solution injected has varied with practitioners, as, 1 part of solution of Perchloride of Iron to 32 parts of water; and 1 part to 6, 4, and 2 parts of water—1 part of iron to 4 of water being the strength more commonly used. Although I have never used this agent, having met with success in post partum hemorrhage from the measures heretofore recommended, yet should these ever fail me, I should not hesitate to employ the one under consideration, deeming it safe and justifiable, and should employ 1 part to 15 or 20 of water.

An important point, to which I have heretofore adverted, is not to interfere when *syncope* is present. Any depression of vascular action is favorable to coagulation of the blood, and we most commonly find a cessation of the discharge while the patient lies in this condition; and an attempt, at this time, to introduce the hand within the uterus, or to inject fluids into its cavity, may, by removing the clots formed, occasion a fatal renewal of the hemorrhage. Neither should stimulants be given unless absolutely required, because the sudden increase in arterial action occasioned by their exhibition may not only prevent a coagulum from forming, but may also remove that which has already been deposited over the orifices of the bleeding vessels—of course, increasing the dangers of the hemorrhage.

Indeed, stimulants are only to be administered when the system has become considerably depressed, and when there is reason to fear that the syncope would prove mortal: then the vascular action must be sustained and the vital energies aroused, as indispensable measures. Brandy, rum, ether, ammonia, cordials, etc., may be given, as heretofore recommended in hemorrhage from placenta prævia. At this time, it will be extremely improper to continue the local applications of cold, as their influence will be to augment the depression of the system.

Some writers have advised the employment of the tampon, but it is bad practice. The danger of giving rise to a concealed hemorrhage should always deter us from using the tampon in uterine hemorrhage occurring, especially at the parturient period, unless, indeed, we except the instances of placenta prævia already referred to.

In cases of excessive prostration, *transfusion* has been advised. I have no knowledge of its effects from my own experience, but the recorded instances, of some years past, with which I have become acquainted did not tend to give me any exalted opinion of it. Still, lives have been saved by it, and the late improvements in the instruments, etc., employed for this purpose, render it very probable that very many more will be. It should be resorted to in all cases, when possible, where loss of blood alone is rapidly destroying life.

THE AFTER-TREATMENT OF HEMORRHAGE requires some attention: for although the discharge may be arrested, and the uterus contracted, yet there may be a return of relaxation of the uterine muscular fibers, with an accompanying flow; hence many hours may pass before the patient will be entirely free from this danger. As soon as the flooding has been arrested by the means employed for that purpose, a bandage should be firmly applied around the body, so as to secure a steady compression over the fundus uteri: a thick compress

placed between the abdomen and the bandage, will materially aid in accomplishing the desired object, viz.: to prevent the occurrence of any relaxation of the uterine fibers. The bandage should be examined every hour or two, to ascertain that it has not moved, but remains in its proper situation: it frequently happens, that when the bandage becomes loosened, or disturbed from its proper position, there will be a return of the hemorrhage, and of the relaxed condition of the uterus. The ligatures which were applied around the thighs may be loosened, but they should not be removed, at least, until a sufficient time has elapsed to guarantee the safety of the woman from further hemorrhage. Upon no account whatever must she be allowed to move for some hours, proportioned to the severity of the attack. In a moderate flow, she may be "put to bed" carefully, and her linen changed, in the course of five or six hours after its cessation; but in profuse and exhausting attacks, twelve or eighteen hours may elapse before it will be proper to attempt her removal. Sudden death has frequently occurred by raising the patient in a sitting posture, for any purpose; and even a mere change of position from one side of the bed to the other, has resulted fatally. The practitioner will, therefore, see the absolute necessity for strictly enjoining a state of quiescence for a sufficient length of time. It is always better to keep the head somewhat lower than the body. As it would be imprudent to allow the patient to lie in the damp and moisture around her for any length of time, means must be adopted to render her comfortable and dry, without moving her in the least, or allowing her position to be changed. A blanket, or something of the sort, may be slowly and carefully insinuated beneath her, in such a manner as to effect the desired result.

To favor a state of rest, as well as to moderate any irritability of the system, the compound powder of Ipecacuanha and Opium may be administered in a dose of five grains, or a powder composed of Capsicum five grains, Ipecacuanha one grain, Opium half a grain, may be administered every hour or two, as indicated; the addition of Capsicum has an undoubted tendency, it is claimed, to prevent a return of the hemorrhage, in a majority of cases. The apartment in which the female lies should be well ventilated, darkened, and the temperature must not be too elevated. If much exhaustion is present, cold, nourishing, and easily digested fluids may be given at short and regular periods, as gruel, beef tea, etc.; and when the prostration is excessive, some stimulant may be added. Visitors must positively be forbidden: no one is required to be in the room, save the physician, nurse, and

husband. Talking, or mental excitement, whether pleasurable or not, is very apt to induce a return of the flow, and should be prohibited.

In cases where the hemorrhage has not been profuse, the practitioner should not leave the patient for two or three hours; but in the more copious and exhausting discharges, the female is not thoroughly safe until five or six hours have elapsed since their arrest; and she should not be left, in these instances, until this period has passed by. A careful and conscientious accoucheur will never leave his patient at too early a period, but will remain and watch her closely. If the pulse be quick, compressible, and jerking, indicative of hemorrhage, he will be on his guard, and prepared to meet it on its first appearance.

When females are liable to attacks of hemorrhage after the expulsion of the child, or placenta, it may frequently be prevented by the use of some uterine tonic during the last three or four months of utero-gestation; as, for instance, the Parturient Balm, Sp. Tr. Macrotys, Aletris, etc. And at the time of labor, the os uteri being dilatable, the membranes may be ruptured at an early period, when the presentation is natural; and as soon as the child is born, the bandage and compress over the fundus uteri should be firmly applied.

In cases of excessive hemorrhage, and after the patient has fully recovered from the syncope, a powerful *reaction* usually ensues, accompanied with a greater or less degree of nervous irritability. The velocity of the circulation becomes increased in proportion to the decrease which the blood has experienced, its momentum probably atoning for the deficiency in quantity. Fever is commonly present when this reaction occurs.

There will be throbbing of the temples, a distressing pain in the head, vertigo, ringing in the ears, and an intolerance of noise, and occasionally of light. In nearly every case pain in the head will be complained of, accompanied with a sensation or noise, which may be variously compared to the beating of a small hammer within the skull, the ticking of a clock, the singing of a tea-kettle, or the roaring of the sea, and which is probably owing to the forcible contraction of the arteries upon the diminished amount of blood contained in them, propelling it onward by jerks. The pulse will be quick, small, jerking, and wiry or compressible; the least motion causes great disquietude; there will be a sense of faintness and of impending dissolution, especially on being raised from the pillow. The skin becomes hot and dry, the mouth dry and parched, and the features are shriveled,

with a contracted state of the lips and nose. Palpitations or flutterings of the heart are often present, as well as panting, sighing, moaning, dyspnœa, and sometimes a hacking, irritating cough. Fresh air or the smelling-bottle will frequently be called for. On awaking from sleep, or on being suddenly disturbed, the patient will exhibit a degree of hurry and alarm. Sometimes there will be retching, or vomiting, hiccough, and a dislike for solid food. All the secretions become lessened, the bowels are flatulent, and constipation or diarrhea may be present. Wakefulness is not uncommon. Various organs, as the peritoneum, pleura, or brain, may present symptoms of inflammation; and upon arising or assuming the erect position, death may suddenly occur.

These symptoms will, of course, vary, both in kind and degree, in different females, depending on the extent of prostration and other concomitant circumstances; but the peculiar pain and noise in the head will very rarely be absent.

TREATMENT.—The above disagreeable conditions are dependent on a diminution of the quantity of blood in the system, and the indications will be, to increase the amount of blood, to impart tone and vigor to the constitution, and to remove the various unpleasant symptoms with which the patient is annoyed.

To fulfill the first and second indications, it will be necessary to allow the patient nutritious and easily-digested articles of diet, as boiled milk, arrowroot, calf's-foot jelly, beef, mutton, and chicken broths, oyster soup, custard, soft-boiled eggs, Indian-meal gruel, etc. If required, wine or brandy may be added to the diet, and even ale or porter is admissible in some cases; but all stimuli should be allowed with much caution. The nourishment should be given at regular periods, and in small quantities, so as not to oppress or offend the stomach.

For the removal of annoying symptoms several means may be required. Thus, the heat and dryness of the surface may be relieved by sponging the head, body, and limbs with cold or tepid water, or vinegar, as circumstances will indicate: the Sp. Tr. Pulsatilla will likewise assist in the accomplishment of this result, as well as to allay nervous irritability and relieve the distress in the head; and the patient should be kept in a cool and well ventilated room, and in a state of perfect quiet and rest. Where Opium, or its salts or Morphia, are called for, and disagree, other agents may be advantageously exhibited, as Sp. Trs. Hyoscyamus, Gelsemium, or a few

doses of Bromide of Potassium, etc. The Sp. Trs. of Hyoscyamus, Pulsatilla, Rhus Tox. or Aconite will frequently afford much relief in allaying pain and nervous irritation; they should be given either singly or in such combinations as indications direct. As little medicine as possible should be employed in these cases; the greatest reliance must be placed upon fresh air, quiet, and nourishment.

Constipation may be treated by Seidlitz powders; by the mixture of Rhubarb two parts, and Bicarbonate of Potassa one part, heretofore referred to; or by rectal injections. But in all instances active medication of any kind must be positively avoided. The distress in the head, quick pulse, fever, constipation, etc., may lead the young accoucheur to suppose that relief will be obtained by an active purge, which, if administered, may prove injurious to his patient. The difficulty, as before remarked, is due to the loss of blood, and not to any determination of this fluid to the brain or other organ; and so soon as the blood-vessels become filled with the necessary amount of their proper fluid, all the symptoms will disappear. However, should the face, instead of the usual pale appearance, become tumid and slightly florid, from an excess of blood in the veins, warm applications may be applied to the feet and limbs, with cold to the face and head, for the purpose of equalizing the circulation.

The patient must not be allowed to get up, for any purpose whatever, until all the above-described symptoms have disappeared; and when this is attempted, care must be taken that it be effected slowly, and that at first the sittings be for a very short period only. And should the sitting posture occasion a sensation of faintness, it must be dispensed with, and not tried again for a few days. Too much attention can not be paid to this point.

CHAPTER XXXIX.

COMPLICATED LABOR—RETENTION OF THE PLACENTA—HOUR-GLASS CONTRACTION—MORBID ADHESION OF THE PLACENTA—PYTREFACTIVE ABSORPTION.

IN primiparæ, the placenta, in the greater number of instances, immediately follows the expulsion of the child, and with others it usually comes away in from five to twenty minutes thereafter; but cases frequently occur in which it remains without hemorrhage for

hours, or even days, if permitted, before it will pass off; and whenever it is not expelled within an hour after the birth of the child, it is called a *retained placenta*.

Young accoucheurs frequently mistake a delayed appearance of the placenta for a retention; thus, the mass may be detached and lie loosely within the cavity of the uterus, or within the upper part of the vagina, or partly within each, and not advancing any further, may be erroneously considered a retention; whereas, some simple expedient, as firmly grasping the fundus uteri; the patient blowing in her hand or in a bottle, sneezing, coughing, bearing down, or artificially producing retching, will at once liberate it. Ordinarily, the last uterine pains which effect the delivery of the child, either completely or partially detach the placenta, and the mass will remain within the cavity of the organ until expelled by a return of its contractions. When the detachment is partial, or even when complete, dangerous hemorrhage may ensue, especially when the uterus is in a state of inertia. If, however, no detachment has taken place, and the placenta is entirely adherent to the uterus, there will be no immediate danger from flooding.

The placenta may be retained without accompanying hemorrhage, and instances are recorded where it has remained within the uterus for several days without causing any bad effects: cases have likewise been met with where it never left the uterus, having been, probably, absorbed by the uterine vessels. Several authors have counseled us not to extract the placenta at all, unless hemorrhage be present, but leave it entirely to the natural powers; it has, however, been found by experience that, more commonly, an attention to this advice is fraught with danger to the female, who becomes thereby exposed to hemorrhage, uterine inflammation, or constitutional irritation (septicæmia) from absorption of putrid animal matter, as marked by vomiting, purging, and typhoid symptoms. Severe after-pains frequently accompany a retained placenta, but while these exist, they are useful, being evidences of the contractions of the uterus; still, the female often suffers unnecessarily from them, by not having the after-birth expelled.

An accoucheur should never leave his patient with the placenta undelivered, because she is not safe while it remains within the uterine cavity; beside, any uncommon delay will give rise to mental excitement and anxiety, from an apprehension on her part that he is not thoroughly versed in his profession, or else that there is some great danger present. Her friends will likewise be very apt to increase her

agitation and fears by whispered suggestions of a similar character. And in case of a retention, he should remain for an hour or two with her after the cake has been extracted, to guard against subsequent hemorrhage.

In 259,250 cases, retention of the placenta occurred 293 times, or about 1 in 661 $\frac{1}{3}$; in 186 cases, 36 died, or about 1 in 5; the immediate cause of the fatality being hemorrhage.—(*Churchill*.) Three causes have been assigned for this difficulty:—1, inertia of the uterus, or want of uterine contraction; 2, spasmodic or irregular contraction of the uterus; and 3, morbid adhesion of the placenta to the uterus. These causes and their treatment will be considered separately.—Although arranged under different heads, it may be stated here, that rigidity of the os uteri, hour-glass contraction, inversion of the uterus, and violent after-pains are convertible symptoms due to the same cause,—irregular uterine action, requiring similar treatment with proper modifications.

1. RETENTION OF THE PLACENTA, FROM INERTIA OF THE UTERUS, more frequently occurs after a difficult, protracted labor, though it may be due to a large pelvis, in which the uterus is allowed to suddenly evacuate its contents—but, in the latter instance, hemorrhage is apt to ensue, before the organ can sufficiently recover, from its abrupt disgorgement, to contract.

Upon placing the hand on the abdomen, the uterus, instead of being firm, hard, and well defined, indications of its normal contraction, will be found large, soft, and flabby, scarcely distinguishable through the abdominal parietes, from the other viscera in the hypogastrium; there will be no pains, or, if they do occur, they will be very feeble and indistinct.

TREATMENT.—Retention of the placenta, with accompanying hemorrhage, has already been considered; those cases will now be referred to, in which flooding is absent.

The principal indication is, to adopt measures to induce uterine contraction. For this purpose, frictions and firm pressure with the palm of the hand over the fundus uteri, and at the same time gentle tractions upon the umbilical cord in the direction of the axis of the superior strait, should be made. In compressing the uterine globe, in *all cases* where it is in a soft and flabby condition, much care should be taken not to indent the organ, lest an inversion of it be effected—for in a relaxed state, it will be an easy matter for a careless or ignorant person to cause such a depression by exerting an unnecessary amount

of pressure. Again, in making tractions upon the cord, too much force must be avoided, else it may be torn from the placenta: or the placenta may be forced from its uterine attachment, giving rise to profuse and dangerous flooding; or the uterus may be either prolapsed or inverted. Slight tractions upon the cord, to solicit or arouse the uterus to action, are allowable; but no attempts to draw out the placenta by it should *ever be made* while the uterus is in a relaxed condition; any effort of this kind should only be attempted when the organ is contracted, and then, the amount of force employed should be moderate. Frequently, the sudden application to the abdomen of a napkin wet with cold water, or a sprinkling of cold water upon the abdomen and thighs, will excite the uterus to action.

So also will coughing, blowing, sneezing, etc., or retching may be produced by titillating the throat and fauces with a feather. If these do not answer, Ergot may be administered; I prefer Lloyd's Ergot, and it may be administered in one-half to three-quarters of a teaspoonful as a dose, repeating it every twenty or thirty minutes, until contractions are induced. Cinnamon or Macrotys will frequently prove more advantageous than the Ergot; Sulphate of Quinia, as well as Strychnia, have frequently proved effective in these cases. After a certain time, should the above means prove unsuccessful, it will then become necessary to pass up the hand and extract the placenta. The time necessary to elapse before attempting this manual operation is generally stated at an hour, or an hour and a half; yet there can be no positive rule, to guide us; for instance, when the labor has been very tedious and severe, the uterus being sluggish and inactive, without hemorrhage, the operation may be safely delayed for even a longer period; and in many instances of this kind it will be found that the placenta has been remaining nearly all the time in the upper part of the vagina; consequently, under such circumstances, it will be well to make an exploration of the parts within a half hour. It must be remembered, however, that the sooner after delivery the more easily can the hand be introduced into the uterine cavity, as the parts will be in a more relaxed condition; and the manipulation should never be delayed until the parts have so far recovered their original firmness as to render the entrance of the hand painful and difficult. One hour and a half, under ordinary circumstances, or three hours in cases of extremely tedious labor, may, perhaps, be considered the limits; although I have, in two instances, readily introduced the hand within the vaginal and uterine cavities, and safely removed the placenta, seven hours after the birth of the child; in each case the labor having been very protracted. The mode

of removing the placenta has already been described under the treatment of Hemorrhage during its retention.

Be extremely careful never to withdraw the hand from the cavity of the uterus, holding the placenta, without first having induced contractions of the organ; and should these not occur, after the placenta has been detached, the hand must be kept in the uterus, until they have been excited by some of the various methods already recommended. And after the mass has been abstracted, it should be carefully examined to ascertain that no portion of it has been left behind. The prudent introduction of the hand into the womb for the abstraction of the placenta, is always safer than the attempt by forcible traction upon the cord. As soon as the placental mass has been delivered, do not fail to secure the permanency of the uterine contractions, by the application of the bandage, and if necessary, a compress. Crède's method is frequently useful.

Dr. Murphy, in his Lectures on Parturition, observes: "*Retention of the placenta* may arise from different causes. Sometimes the sphincter of the vagina closes upon it, and the placenta is thus retained until removed by the hand, or by firm pressure on the fundus of the uterus. In other instances, the *placenta remains in the uterus* after the delivery of the child, until it is expelled by its subsequent contractions, rendered efficient by similar contractions of the diaphragm and abdominal muscles. This additional aid is required, inasmuch as the action of the uterus alone is not sufficient for the purpose. Hence, when the abdominal muscles are feeble, so that the uterus can derive no support from them, the *placenta is retained in this cavity*. This cause of retention has been generally mistaken for *inertia* of the uterus; and, under this impression, the placenta has been, very necessarily, withdrawn from the uterine cavity. * * * When the child leaves the uterus, a very powerful stimulus to its action is removed; and this stimulus the placenta is quite inadequate to supply. The uterus, therefore, first ceases to act for a certain time, and when the action is renewed, it is weak, and continues only for a short time. If the uterus fails in discharging the placenta by a few of these efforts, it becomes accustomed, as it were, to its presence, and it no longer acts as a stimulus, but remains with the uterus imperfectly contracted around it. A very efficient means of supplying this want of irritation to the uterus, is the pressure of the abdominal viscera which surround it. When the abdominal muscles are strong, they contract upon the retiring uterus, compressing the intestines, and consequently the uterus, on all sides. These weak pains, therefore, are greatly assisted and rendered effectual

by the straining efforts of the patient acting as a stimulus to the uterus from without. But the abdominal muscles are not always strong; on the contrary, in most instances, they are extremely weak, in consequence of our civilized habits. They are too often reduced almost to a state of atony from the constant pressure of the corset; hence it follows that the uterus derives little or no support from them, and the placenta is retained, not from any want of power in the uterus to expel it, but from a want of efficient stimulus to cause the uterus to contract. There is no *inertia* of the uterus, but only a suspension of its action. It is for this reason, and to supply this deficiency, that the pressure of the hand on the fundus of the uterus, during the expulsion of the child, is found so useful; and, on the same principle, the application of a bandage round the abdomen is always necessary, in order to give it proper support."

2. **IRREGULAR CONTRACTION OF THE UTERUS**, termed *Hour-glass Contraction*, sometimes accompanies retained placenta. It may affect any part of the uterus, but is more commonly met with at the os uteri. True hour-glass contraction is a strictured condition of the central portion of the organ, dividing it into two chambers, an upper one, which usually contains the placenta, and a lower one; it is rarely met with in practice.

Sometimes the uterus contracts longitudinally upon the placenta, having the shape of a cylinder or sugar-loaf; sometimes, there will be a contraction of only one corner; at others, it contracts upon the placenta in a globular form; again, the constriction at the center, forming the true hour-glass contraction, may be met with. The placenta may be completely inclosed above the strictured part, or only partially, part of it being in the cavity above the contracted portion of the uterus, and the remainder passing through the narrowed section into the cavity below. The placenta, in these cases, may be wholly or partially adherent, or it may be detached. Prof. Meigs believes the placenta to be always adherent in hour-glass contraction; Dr. Douglass, of Dublin, thinks it almost invariably occurs with morbid placental adhesion; so likewise does Dr. F. H. Ramsbotham, and in the cases which I have met with, I have found placental adhesions to a greater or less extent in each of them.

This irregular contraction of the uterus may exist in the longitudinal fibers, or in the transverse, and more generally occurs after a rapid delivery by violent and forcible pains. It may, however, follow a protracted or preternatural labor, or a delivery of the child effected

by Ergot, and sometimes happens as the result of an over-distended uterus. Not unfrequently an improper interference with the cord, making traction in the wrong direction, and by jerks, instead of a careful, continuous pull, will irritate the os uteri and cause the womb to contract irregularly; pressure and friction immediately over the pubes instead of over the fundus uteri, has also occasioned the difficulty.

Hemorrhage may, or may not be present; and when it does exist it is generally less profuse and alarming than when there is a complete state of inertia, so that less haste will be required for the extraction of the placenta; this, however, will be found a more difficult and dangerous operation, than in retained after-birth without irregular or spasmodic contraction.

DIAGNOSIS.—Most instances of irregular uterine contraction are impossible to detect by external examination. Generally, the delivery of the child is followed by several severe and strong pains, without any descent of the placenta, and which symptom, in connection with a hard and enlarged condition of the uterus, when felt through the abdominal parietes, and a full and turgid state of the umbilical cord, may lead to a suspicion of the difficulty.

Should the uterus contract in the cylindrical form, it may be detected through the abdomen, the fundus being felt at the epigastrium, and the body conveying to the fingers the sensation of a roll or cylinder.

If it be a true hour-glass contraction, it may likewise be detected by abdominal palpation. The uterus will be found to form two tumors just above the pubis, the larger one of which contains the placenta, while the smaller is joined to the other by a kind of neck, which is the constricted central portion of the uterus.

But the more positive method of ascertaining the difficulty is by an examination per vaginam. Passing the hand along the cord, the *cervix* may be found hard and firmly contracted, resisting the introduction of a finger, while the other hand placed upon the abdomen, will find the uterine globe relaxed, or at all events, less firmly condensed than the *cervix*. If the constriction is not at this point, the hand must be carefully carried into the uterus, following the cord, when it will, at some point, detect an aperture which leads into the upper chamber, and, perhaps, a portion of the placenta may be felt protruding through it. In this case, the lower part of the uterus will be usually soft and flabby while the portion above the stricture will be harder and firmer. The accoucheur must not mistake this aperture

for a rupture of the uterus; for, it must be borne in mind, that while the child escapes through a rupture, the placenta seldom does.

TREATMENT.—This will depend somewhat upon the presence or absence of hemorrhage. If it be present and profuse, the accoucheur will at once attempt the extraction of the placenta, in the manner described hereafter; if it be not very profuse or alarming, he will proceed in his management more slowly and cautiously, being governed, in this respect, by the effects of the loss of blood upon the patient.

Where hemorrhage does not exist, and the placenta does not pass away, within the ordinary period, there is no necessity for haste, unless, indeed, a true hour-glass contraction be ascertained, when interference should be promptly attempted, there being, in such case, but a small chance for the spontaneous expulsion of the placenta.

In all other cases, where there are no additional circumstances present requiring interference, attempts should not be made to remove the placenta artificially, for at least an hour after the birth of the child. The treatment employed in the mean time, should be the same as already recommended in retention from inertia, as constant pressure over the fundus, slight but continued traction upon the cord in the direction of the axis of the superior strait, etc., and which will frequently subdue the spasmodic action, and effect a sudden ejection of the placenta. And if there be much mental excitement on the part of the patient, this should be allayed by some anodyne. An hour having passed without indications of an expulsion of the placenta, the manual operation will have to be attempted. Introduce the hand into the vagina in the usual way, and then into the uterus. If the constriction be at the os cervix, gently and carefully introduce first one finger and then another, until, if necessary, the whole hand has entered; but frequently, the os may be dilated with two fingers, so that the placenta may be seized and slowly worked out—and, sometimes, this dilatation alone will remove the spasm and induce normal contractions, followed by a delivery of the secundines.

If the contracted portion be higher up, the hand being guided by the cord, will have to be passed upward until the constriction is reached, and then, as before, first one finger, then another must be introduced, gradually and steadily dilating the strictured part as they enter, until the whole hand has been insinuated; then, if the placenta be adherent, it must be carefully and entirely detached, and the hand and secundines suffered to pass out by the uterine contractions only. If the mass be removed before the uterus acts, hemorrhage may come

on, hence it is important to induce the action of the organ before withdrawing the hand.

The practitioner must not forget, while attempting the intromission of the hand through the contracted aperture of the uterus, to place his other hand upon the abdomen externally, and press upon the fundus downward, in the direction of the operating hand. If this be neglected, the womb may be so far elevated by the hand within as to render it somewhat difficult, if not impossible, to enter it. Sometimes the hand may be readily passed beyond the contracted part; at others, time, perseverance, and gentleness, will be required before the object can be accomplished.

Occasionally the contraction will be extraordinarily firm, and if dilatation be effected, it will be followed by yet firmer contraction, requiring so much force to enable the fingers or hand to enter, as would be liable to cause laceration if the attempt be imprudently persisted in. Such force must never be employed. If the placenta can not be removed without violence, let it alone, and pursue the course named under the treatment of Morbid Adhesion. In these cases the uterus is usually in a very irritable condition.

Bleeding has been recommended in these instances, to effect relaxation, but it is a very objectionable course, as it must not only unnecessarily debilitate the patient, but place her life in a very precarious situation, should a profuse flooding from the uterus follow the relaxation caused by it.

Chloroform has been exhibited in these instances, for the purpose of causing relaxation, with success. In some cases Gelsemium or Lobelia give very satisfactory results, as does also the compound tincture of Lobelia and Capsicum. Ergot has been advised, but, I think, upon unsafe grounds. As soon as the moment of relaxation occurs, the hand should be introduced, and the placenta extracted.

The compound tincture of Lobelia and Capsicum may be exhibited either by mouth, or by injection into the rectum. I prefer the latter mode, which is the one I have used the oftenest and with decided success. The contents of the rectum having been first removed by an enema, the above tincture, in the quantity of three or four fluidrachms, may be at once injected. It usually acts with promptness in overcoming the spasms, when the hand should at once be introduced, if demanded. If, as may sometimes be required, it becomes necessary to give this antispasmodic by mouth, one or two fluidrachms may be taken for a dose. In either case it must not be diluted. It rarely produces a degree of relaxation sufficient to give apprehensions of

hemorrhage: generally, as soon as the spasm has been overcome and the secundines removed, the uterus contracts regularly and permanently. If much relaxation of the system should follow its use, Carbonate of Ammonia, Ether, or other stimulant, will speedily effect a beneficial change.

In the exhibition of this tincture per rectum, it will sometimes be found, as I have experienced in my own practice, as well as ascertained in that of others, that an introduction of the hand will not be needed; for as the spasm is subdued the uterus will act normally, and the placenta will be expelled without any further assistance.

The Sp. Tr. of Gelsemium, when the parts are tense, hot and rigid, is especially indicated, and under such circumstances will, it is claimed, produce complete relaxation. That it will effect the desired dilatation will hardly be doubted by any one who has ever used it; but whether the persistency of its relaxing influence can be promptly obviated, and a tendency to flooding thereby lessened or prevented, I am not, from my own knowledge of its use in these cases, prepared to say, although, in the absence of Chloroform, I think I should not hesitate to administer it, using at the same time, however, a degree of watchfulness and prudence.

When the placenta is partly within the uterus and partly within the vagina, the os uteri having contracted upon it, no attempts to remove it by forcible pulling should be made, as this would be very apt to tear it; the only method for its removal should be a gentle dilatation of the os by means of the fingers.

When the placenta has been extracted, examine it carefully, as has been heretofore recommended; and do not forget the necessity for securing a regular, equal, and permanent uterine contractility.

For irregular pains, Macrotys should probably be first considered; Lobelia or Gelsemium should be chosen if the irregularity is due to want of complete dilatation; Sulphate of Quinine will likewise overcome the trouble in some cases. The Parturient Balm, taken during the last two or three months of gestation, will prevent irregular action of the uterus at the time of labor.

3. PLACENTAL RETENTION *from a* MORBID ADHESION *to the* UTERUS, is sometimes met with, and is of a more critical nature than the previous varieties. It may exist in conjunction with

irregular contraction, or with inertia of the uterus, which last renders it more formidable, from the dangerous hemorrhage apt to be present; frequently a few minutes decide the question of life or death.

The adhesion may be complete, in which case there will be no flooding until detachment ensues; or it may be partial, and commonly with hemorrhage. The copiousness of the discharge will be in proportion to the extent of detached surface, and the number of vessels exposed.

The cohesive energy existing between the uterus and placenta in these cases, varies considerably; sometimes, the contractions of the uterus are sufficient to detach and expel the mass; at others, the uterus may not be able to cause its separation, which, however, may be readily effected by the hand; again, the cohesion may be so great, as to resist any justifiable attempts to remove it with the hand. And, instances have occurred where, after death, the separation could not be accomplished by maceration, and also where it was impossible to distinguish the line of demarcation between the uterus and placenta when a longitudinal section of these organs had been made.

The causes of morbid placental adhesion are not satisfactorily known. By some authors the difficulty is attributed to a deposition of calcareous or tuberculous matter, from the fact, that these have been found in some portion of the placenta, usually on its maternal surface. Again, it is believed by others, that whenever, from any cause during gestation, an excitement or inflammation of the placenta or uterus is produced, it may result in an effusion of lymph, perhaps, forming a new membrane, which more firmly consolidates the utero-placental attachment. But, whatever, may be imagined on this point, it is evident that morbid adhesion occurs altogether independent of the character or management of labor, and is due entirely to abnormal conditions, either of the placenta, or of the uterus, during pregnancy. It is very apt to recur in the same woman, so that when called to attend such cases (when known) the physician should be more prompt in his movements than in ordinary instances.

DIAGNOSIS.—We can know nothing whatever of a morbid adhesion, until the hand is introduced for the purpose of extraction. It may be suspected, however, when several strong pains occur, without any loosening of the placenta; likewise, when the cord, being moderately drawn upon and then suddenly let loose, springs upward with a jerk. Sometimes the patient, during gestation, complains of a severe, persistent pain at one particular point (that in which the placenta is found attached), and may express her suspicions that “the after-birth is growing fast to her side.”

TREATMENT.—When hemorrhage is present, the case must be managed as described under Hemorrhage with Retention of the Placenta. Hemorrhage requires the detachment and removal of the placenta, or the patient will almost certainly die. If no hemorrhage exist, the adhesion will be, probably, entire.

The early treatment of this difficulty, will be similar to that advised in the preceding varieties—not knowing its true character. This failing, and an hour having elapsed, the hand must be introduced, in the manner heretofore explained, to effect the detachment, at which time the nature of the adhesion will be ascertained. The placenta should be removed, if possible, even at the expense of considerable trouble; but sometimes, its detachment will be impossible.

In these latter cases, there is a diversity of opinion as to the proper course to be pursued, many eminent accoucheurs advise us to remove as much of the placenta as we can, even if it have to be separated in pieces to accomplish this result; while others, recommend us to leave the mass in the uterus, until decomposition has ensued, and then attempt its removal, or if this can not be done, trust to the natural powers, aided by means to overcome the evil results of putrefactive absorption.

When the placenta can be removed without any great violence, it should always be effected; but, if the reverse of this obtains, I think I am warranted by my own experience, in connection with that of many others, in recommending it to be left until decomposition ensues, when a safer opportunity for its extraction may be offered. The tendency to hemorrhage will be less when the whole mass is thus left behind, than when a portion of it has been torn off and removed, the rest remaining adherent. These entire and extremely tenacious adhesions are fortunately quite rare.

In these several instances of retained placenta, no attempts should ever be made to remove it by forcibly pulling upon the cord; neither should the placenta itself, provided a part of it can be seized, be drawn upon, until it has been satisfactorily ascertained that it is perfectly loose, and that no portion of it is retained in a firmly contracted os uteri. Otherwise, an inversion of the uterus may be produced, or, the placenta may be torn, and the remaining adherent portion of it within the uterus, occasion a subsequent hemorrhage.

Should the **UMBILICAL CORD BE RUPTURED**, then, after a failure of the means heretofore recommended for procuring uterine contractions, the hand must be very carefully and gently introduced within the uterus, the placenta sought for, detached, and removed in

the usual manner, being particular to remove it entire, in order to avoid an attack of flooding.

When the placenta is so **FIRMLY RETAINED** by **THE IRREGULAR CONTRACTION OF THE UTERUS**, or by **MORBID ADHESION**, as to resist all legitimate endeavors to remove it, or when portions of it have been permitted to remain in the uterine cavity, the mode of treatment will depend somewhat upon the symptoms which follow.

Generally, severe after-pains are experienced, which interfering with the patient's sleep and quiet, render her very irritable—and these pains are augmented on pressure over the uterine tumour, or when the child is applied to the breast. The discharge from the uterus is at first of a normal amount, and clots are occasionally passed off with it; but in two or three days its character changes, becoming of a dark brownish color, excessively fetid, and accompanied with pieces of the decomposed placenta. This happens, more especially, when only a portion of the mass is left behind.

Soon after putrescency has commenced, from (septicæmia) an absorption of the putrid animal matter, a severe irritative fever attacks the patient, manifesting itself at first by rigors. The pulse becomes small and rapid, the skin, and especially that on the abdomen, becomes hot and dry, pain in the head, of a diversified character comes on—it may be continuous, and accompanied with beating or throbbing, or, it may be intermittent, sharp, and darting. The tongue is at first white, and slimy, or red, shining, and dry; the thirst is inordinate; vomiting is frequently present, or a choking sensation, particularly when the patient endeavors to drink; there is constant restlessness and wakefulness, with mental anxiety, which is plainly depicted upon the countenance. The secretion of milk diminishes; the bowels, at first very torpid, become so excessively loose as to resist the attempts made to check their action. Most usually, erratic pains, of greater or less severity, are present, shooting from one hip to the other, perhaps locating in the neighborhood of the diaphragm and interfering with respiration, or, shifting from one part of the body to another. These symptoms continue to increase, the tongue becomes coated brown or black, the abdomen becomes tumid and tense, the strength rapidly fails, the extremities become cold, vomiting of a dark-brownish granular-like substance occurs, with low delirium, involuntary evacuations of the feces and urine, subsultus tendinum, and in ten or twelve days following delivery, the case terminates fatally.

Ramsbotham states, that "upon dissection, the veins of the uterus are generally found inflamed, and containing pus; the uterus itself, to a greater or less extent, partakes in the inflammatory disposition, and is perhaps gangrenous; or purulent deposits are observed in its substance; and perhaps also in or around some of the larger joints, or among the tendons, or within the fleshy muscles of the limbs."

Sometimes, the placenta is expelled in twelve or twenty-four hours without putrefaction, or any unpleasant consequences; at others, it has been expelled in a putrescent condition, but without causing any irritative fever; and again, in some rare cases, it has never been discharged nor produced any injury to the general health, but has, as supposed by some writers, either been absorbed, or continuing adherent, become organized.

A very favorable indication when putrid absorption takes place, is, to observe that the symptoms are less violent, and the discharge of a puriform character, containing portions of the placenta, having but little or no fetor, and accompanied by no great amount of prostration of the vital powers.

TREATMENT.—When it is ascertained that the placenta can not be removed, a bandage should be applied around the body, in the manner heretofore indicated, with a compress over the fundus, and in two or three days the attempts to abstract the mass should be cautiously and gently renewed. However, should the pains at any time become very severe and continuous, or the presence of the bandage appear to increase them, it must be removed.

When the placental mass can not be artificially abstracted, or when portions of it have been left adhering to the inner uterine wall, and, in either case, putrescency occurs, the indications of treatment will be, to subdue inflammation, correct the fetor of the discharge, and support the vital powers: and for the fulfillment of these, various remedies may be used.

When there is hemorrhage, it must be combated by the means already indicated. When the fever is very high, with great irritability of the system, to subdue it and neutralize to a greater or less extent the influence of the absorbed matter, the proper sedative should first be selected; this will be either Aconite or Veratrum. In addition, agents should be selected to prevent the absorption of putrid matter and the development of septicæmia, as Chlorate of Potassium, Phytolacca, Baptisia, Asepsin, Quinine, etc. Vaginal injections should likewise be used in conjunction with internal treatment, as will be noticed in the following page. When the influence of these agents is

once obtained, by continuing it, together with the other means to combat putrescency, the tendency to vomiting will be considerably lessened. Should there be a great amount of pain, it may become necessary to administer a small dose of Morphia, in conjunction with the means heretofore recommended. The bowels should be kept free by Seidlitz powders and mucilaginous, laxative injections; and when they become immoderately loose, the tincture of Chloride of Iron may be given in doses of ten or twenty drops in sufficient water, and repeated according to the urgency of the case; or teaspoonful doses of Liquor Bismuth, repeated every three hours, will act very kindly.

The surface should be frequently bathed with warm water, or an acidulous solution. In some instances a warm saline solution will be found more efficacious.

To overcome the fetor, and aid in removing the loosened putrid portions, water, as hot as the patient can endure, in which is dissolved either Borax, Chlorate of Potassium, Asepsin, Carbolic Acid, Permanganate of Potassium, or some efficient antiseptic should be injected into the vagina and uterus; this should be repeated at least twice a day. The ports should likewise be washed out with the plain hot water injections sufficiently often to overcome the odor of decomposition. Too much force must not be applied in introducing the fluids into the uterus, lest they be passed into the canal of the Fallopian tubes.

As soon as symptoms of prostration manifest themselves, the above internal treatment must be changed. To overcome the depressing influences of the absorbed putrescency, brewer's yeast may be given internally, ale or porter may also be allowed, and good cider will be found a most salutary and refreshing draught; it may be exhibited frequently. And in the absence of these, an endeavor should be made to sustain the system by Wine, Ether, Ammonia, aromatics, etc.

In conjunction with these, some preparation of Peruvian bark or Quinia must be given. The Sulphites of Soda, Lime, or Magnesia, have also been advised. Various other agents may also be used, combined to suit the indications, as well as views, of the practitioner. The female should be kept cleanly, and the apartment which she occupies be well ventilated, and maintained at a moderate temperature.

CHAPTER XL.

COMPLICATED LABOR—INVERSION OF THE UTERUS—RUPTURE OF
THE UTERUS—RUPTURE OF THE VAGINA—RUPTURE OF
THE BLADDER—SYNCOPE—THROMBUS.

WHEN attempts are made to abstract the placenta by forcibly pulling upon the cord, and especially if these be made when the uterus is in a flaccid condition, the cord may be broken, or the uterus may be inverted. INVERSION OF THE UTERUS may likewise be occasioned by a rude attempt to effect a removal by pulling upon the placenta itself. It may also be owing to a rapid delivery in a large pelvis; to a short umbilical cord; to delivery taking place when the female is in the erect posture; to violent straining during the last pains of the second stage; and it is stated to have occurred spontaneously, or without any satisfactory causes; but, by far the majority of inverted uteri are caused by irregular and violent uterine action. Improper management of the accoucheur may bring it on, but, generally, only in those cases in which the uterus is disposed to active and irregular contractions. It has occurred spontaneously after the mother's death, and has likewise been observed in the unimpregnated and virgin uterus.

This accident may occur immediately after delivery, when it is termed *acute or reducible* inversion; it may not take place for a few days after, in which cases, however, it is stated that a depression of the fundus existed from the first; or, it may happen gradually, in which case, as well as when the acute form has not been removed, it is called *chronic or irreducible inversion*. Sometimes it takes place in the unimpregnated uterus, being occasioned by the presence of a tumor, the growth of which enlarges the organ, until its weight carries it through the os with the fundus attached to it.

An inversion of the uterus is one of the most serious accidents that can befall the parturient female. About one-third of the cases prove fatal, either in a very short time, or within a month after its occurrence. Of one hundred and nine fatal cases recorded, seventy-two died in a few hours; eight in from one to seven days; six in from one to four weeks: or eighty-six in one month.

SYMPTOMS.—The inversion may be partial or complete. When it is partial, a portion of the uterine wall, but more commonly the

fundus, is depressed within the uterine cavity, presenting, internally, a convex surface. This form may prove fatal. It can be detected only by introducing one or more fingers within the uterus, which will discover the convexity of the depressed part; also by external palpation, which will, if the depressed portion be situated anteriorly, discover the concavity formed by it, instead of the usual globular form of the womb. It is apt to induce violent straining and bearing-down efforts, a tenesmus, which may eventually occasion a complete inversion; and which efforts, to any great extent, should *always* be prohibited, after the birth of the child, especially when the uterus is in a non-contracted condition. There may be no pains with it, but a sensation of sinking. Hemorrhage usually accompanies it, and in cases where this is obstinate and long-continued, it may be owing to a depression of the above character, and should be ascertained by passing one or two fingers within the uterine cavity.

Again, in a partial inversion, the advance or depression of the fundus may be so extensive as to be grasped by the inferior part of the uterus, or even pass through the os uteri, but without changing the situation of the cervix. In this case the palpation will discover a greater amount of concavity, or perhaps a vacuity above the pubes, and the finger will detect the fundus filling the lower part of the uterus, feeling like an elastic tumor, more or less painful, or it may be felt protruding through the os into the vagina, being soft and convex, and the hand, by being passed up, can recognize the encircling cervix. The pulse will become small, rapid, and fluttering, with sudden prostration or sinking of the vital energies, which happens independent of any hemorrhage; also paleness of the countenance, nausea, vomiting, and violent bearing-down efforts. The presence of flooding increases the danger.

In complete inversion, the cervix, as well as the whole body, is inverted; the uterus is completely turned inside out; it may be retained within the labia, but more generally a greater or less proportion of it will be found externally, from an accompanying prolapse and inversion of the vagina. Sudden hemorrhage and sinking occurs, with a sensation of fullness in the vagina, and frequently death supervenes, before the practitioner is aware of the accident, from the shock to the nervous system, resulting from strangulation of the fundus. If this does not take place immediately, all the symptoms above enumerated exist in a greater degree. Should the uterus contract, hemorrhage will, probably, be absent.

"It will sometimes happen that, for hours after the accident, not a single pressing symptom shall occur. In general, however, when a womb is left in the inverted position, the patient is still liable for hours, and days afterward, to large and even fatal eruptions of blood, of which I have myself been a witness; add to which, that independently of the flooding, mere displacement of the parts may, perhaps, give rise to more or less collapse; obstruction of the bladder, too, is not unfrequent, and the introduction of the catheter may become necessary." (*Blundell.*)

DIAGNOSIS.—*Great care* must be taken not to confound an inverted uterus with some other difficulty. It has been mistaken for a head, or a breech presentation of another child, for a placenta, a polypus, a mole, a clot, an excrescence, etc.; and instances are not wanting, where the uterus, mistaken for something else, has been torn from the female by an ignorant practitioner, occasioning the most agonizing torture, followed by a rapidly fatal termination.

In connection with the symptoms and examinations named above, the uterus will be recognized, when its inversion is complete, by its rough, flocculent, and bleeding surface, and by its size and shape. If it can be inspected visually, the fibrous tumor will be of a red color, but which gradually changes to a dull brown when the difficulty becomes permanent. Upon abdominal palpation, the uterine fundus is not to be felt, and on attempting to pass the sound into the uterine cavity, the os and canal of the cervix will not be found. The inversion usually occurs shortly after the expulsion of the fetus, and may occur with or without attachment of the placenta.

PROGNOSIS.—Those cases which occur spontaneously are said to be more hazardous than those occasioned by traction of the cord; and the rapid attack of the inversion, accompanied with uterine inertia, greatly augments the danger. The more incomplete the extent of the inversion, and the more slowly it occurs, the more favorable will it be for the patient. Again, the sooner the reduction of the inversion is effected the better; delay augments the difficulties attending the operation.

Usually, the hemorrhage, or the severe shock upon the nervous system occasions the death of the patient. Sometimes the inverted organ becomes inflamed, and, being strangulated by the contraction of the cervix, gangrene and sloughing ensue, followed by death; cases, however, have been recorded where such a condition has terminated favorably. Again, when patients have passed safely through

the early period of inversion, they have been known to live for many years, without its occasioning them much annoyance; of course, in these instances, the organ very much diminishes in size. Occasionally, the tumor becomes attacked by some malignant form of disease.

Spontaneous reduction of partial inversions, as well as of chronic inversions, are recorded to have been met with. A ready reduction of acute cases is not always successful, as the patient may have been too much exhausted before it was accomplished; or, it may be followed after a few days, or even months, by death, the consequence of the violence which the uterus has suffered. Generally, in these latter instances, the danger returns with the catamenia.

TREATMENT.—In partial or incomplete inversion, two or three fingers, or the whole hand, if necessary, may be introduced within the uterine cavity, and the depressed portion be gradually, but continuously pushed upward. When the reduction is finished, provided the whole hand has been introduced, it should not be removed until contractions have taken place, or else, the inversion may be renewed, or, hemorrhage ensue.

When the inversion is complete, its reduction should be attempted without delay, because, the longer it remains without re-position, the more difficult will be the operation, from the continued contraction of the os uteri, which, by impeding the circulation, causes the uterine tumor to enlarge. A delay of an hour or two may render any successful endeavors impossible; and its continuance for one or two days, generally renders it irreducible. However, a few rare cases are recorded in which re-position was effected after eleven weeks had transpired, and one of sixty-six weeks; but such cases are exceptions, and should never be anticipated. Spontaneous reduction of chronic inversion has been noticed by several writers.

In effecting the reduction, it will be found that it can be accomplished with greater facility, the sooner it is undertaken after the occurrence of the accident. There are several modes advised for the operation. One is, after anointing the hands thoroughly with lard, vaseline or sweet oil, to grasp the uterus with both hands, lessening its bulk by compression, and steadily pressing upward, so that the mouth, then the cervix, the body, and the fundus, successively pass into their natural positions; this, however, is rather a difficult method, as the pressure exerted upon the organ by the hands will be very apt to occasion contractions, during which all attempts will be futile.

Another method is, to firmly press the back of the fingers against the fundus, the hand being held in a half-closed condition, and effect the replacement in this manner, which usually takes place with a jerk.

But, probably, the best mode is, to place the fingers in a conical form, press them, thus closed, upon the fundus, indent it, and carry it upward through the os uteri, the body and neck necessarily following.—Of course, the practitioner will decide which course to pursue according to the conditions present.

Several points, however, are necessary to be attended to. The female, if not too much exhausted, must be placed on her back, with the hips considerably elevated above the chest (though when the reduction is attempted immediately after the inversion, this is not so essential); and the legs and thighs flexed and separated. The hand to be employed should be well oiled, and the operation should not be undertaken, nor persisted in, while the organ contracts, but only during its state of softness and relaxation. Before attempting the indentation of the fundus, the inverted organ must first, if possible, be pushed up beyond the vaginal orifice, and no effect will be produced until the upward pressure shall have caused some extension of the vagina. The pressure should not be made against the pubic arch, but in the direction of the axis of the pelvic cavity, and to correspond as nearly as possible with its center; the practitioner *must not forget* the direction of the axes of the straits and pelvis during the operation, as this will only be successful by carrying the fundus upward in their line. Should the perineum interfere with the operation, press it backward while passing the organ by it. The pressure should be firm and continuous, making no effort when the uterus contracts, except that of securing what has been gained, by resisting any tendency toward a return to its first misplaced condition. Most commonly the fundus returns to its normal situation, by a sudden jerk, or start, somewhat like a gum-elastic bottle when turned inside out. Too much force should never be employed in the operation, lest the uterus or vagina be lacerated; a moderate force, steadily persisted in, will prove the safest and most successful. Whatever may be the extent of the inversion, after its reduction, the hand being within the uterine cavity, should be retained there until the contractions of the organ expel it, using means to forward these if required; and be certain that the restoration is complete before allowing the hand to be expelled. A depression of the fundus remaining, may occasion violent bearing-down efforts, followed by a return, and perhaps an irreducible state,

of the inversion. A case is recorded in which the inversion was repeated three times, immediately following each replacement; and finally by holding up the fundus with the hand externally, filling the uterine cavity with lumps of ice, and giving ergot, the accoucheur succeeded in securing firm contraction, and the patient recovered. In a case of this kind to overcome the violent and irregular action of the uterus, I should either administer the compound tincture of Lobelia and Capsicum, or, alternate Gelsemium with Aconite, or with Sulphate of Quinine.

The inversion may happen with complete detachment of the placenta, or it may be more or less adherent. When adherent, there is a diversity of opinion as to the management, some recommending it to be removed, before proceeding with the re-position, and others advising us not to remove it, until the restoration has been completely established.

When the uterus is in a relaxed state, and the placenta is completely adherent, or nearly so, to remove it would be very apt to cause a hemorrhage which might prove suddenly fatal; or uterine contractions might follow the detachment, rendering a reduction of the inversion very difficult, or altogether impossible; hence, in such cases, it were better to return the placenta with the uterus, before detaching it, if this can be done, and then to treat the case as a retained placenta.

When the placenta is detached to a considerable extent, and the remaining adhesions can be readily separated, it may be proper to attempt this previous to the reduction; unless the hemorrhage from the vessels already exposed be very profuse, when the safest course would be to abstract the cake only after the replacement of the uterus. A slight and easily-separated adhesion, can not seriously augment the flooding, hence, its removal should be accomplished before the operation.

There may be cases in which it will be impossible to return the uterus while the placenta adheres, and here the difficulty will be very great; a detachment of it may be followed by dangerous hemorrhage, or by contractions which will interfere with the success of the operation. The case is necessarily one of danger, shall we increase the risks by removing the placenta? Perhaps it may be a better course than to run the chances of a chronic inversion. I can not speak from experience; but whichever course is adopted, be certain that the reduction is impossible, by a persevering effort, and that the obstacle is the presence of the placenta, and not improper or badly-directed

efforts. Several writers state, that in such cases, they have detached the placenta without any subsequent bad results; while others, strongly advise its removal in all cases previous to attempting reduction of the inversion.

Exhaustion and depression of the vital energies must be combated by stimuli and appropriate treatment, similar to that laid down when speaking of hemorrhage. The female should not be allowed to get up too soon after the reduction, keeping her in a horizontal position, with the head depressed and the hips considerably elevated, the knees and thighs being bent, and all strainings at stool or bearing-down efforts, should be forbidden; the bowels should be kept free by mild laxatives or injections.

When the uterus has once been inverted during a labor, it has a strong disposition to renewal of the difficulty in consecutive ones; therefore, with such patients it will be improper to make any tractions upon the cord to abstract the placenta; if pressure upon the fundus with frictions will not expel it, the best course will be to introduce the hand within the cavity of the uterus, and remove the mass in the manner heretofore explained.

If the inversion has been of several days' standing, it has been advised not to omit attempts at the reduction, from the fact that it has been reduced, in many instances, after a lapse of weeks and even months. But in these cases, from the long-continued strangulation, the uterus becomes swollen, and the parts hot and dry—therefore, before operating, these conditions must be overcome by anodyne and relaxing fomentations or soft ointments locally applied, together with such internal measures as may be indicated. Probably, the compound tincture of Lobelia and Capsicum might aid in causing sufficient relaxation to permit its reduction; but from the nausea and vomiting which this might, probably, produce, I would prefer the following plan: Having emptied the bladder and rectum, place the patient under the relaxing influence of the tincture of Gelsemium; at the same time, should the uterus be external to the vulva, envelop it in cloths wet with warm water, without permitting any evaporation to take place, changing them from time to time, if necessary. Relaxation of the muscular fibers of the organ having followed this course, then attempt the reduction. I have never had an opportunity of trying this method, but merely suggest it to the profession; from a knowledge of the influence of the agents named, upon the system, I believe it will be found successful in very many instances of chronic inversion.

At all events I should try it, before undertaking any of the severe and painful methods recommended for removing the uterus. Long continuous pressure upon the inverted fundus, by means of elastic bags filled with water, and then passed into the vagina, has also been advised.

After the replacement of a chronic inversion, the female should be treated the same as advised under the acute form; and, in either form, it may be beneficial to protect the uterus, for a number of weeks or months, from the superincumbent weight of the intestines, by the application of an abdominal supporter immediately below the umbilicus, whose force shall be directed inward and upward.

When the inversion can not be overcome, palliative measures are all that can be recommended, and if the uterus falls out of the vulva, it should be placed beyond external danger, by returning it within the vagina, and retaining it there by a bandage and compress; at the same time using the abdominal supporter above referred to.

It has been advised by several eminent writers to remove the uterus, in irreducible cases, by the ligature, *écraseur*, or the knife; and instances are not wanting where its extirpation by these means, or by gangrene and sloughing, the result of its strangulation by the os uteri, has resulted favorably. Still, as long as the female experiences no great amount of discomfort, or any alarming symptoms, I can see no necessity for the operation—it appears to me cruel and uncalled for, especially when we bear in mind, that females have labored under this accident for many years without any very unpleasant or exhausting symptoms. Beside which, cases of spontaneous reduction have been recorded, in which pregnancy subsequently occurred; although this is by no means desirable.

However, should the uterus be attacked by some malignant disease, while in this displaced condition, its extirpation may be followed by favorable results. The ligature employed is usually either silk, silver-wire, or whip-cord; it may be applied around the uterus at its highest part, and gradually tightened as the patient can bear it, until the separation has taken place. Should it cause any violent symptoms, it must be loosened for a time, until these have been subdued. The strength of the patient must be kept up by a non-stimulating, nutritious diet.

When the knife is employed, a ligature should be first applied as above, for the purpose of preventing hemorrhage, and the excision be made immediately below the ligature. In a case where extirpation of

the inverted uterus would be desirable, instead of the preceding operations, I would first endeavor to remove it by means of Galvanic Heat, which I believe would effect it without the loss of much blood, or any subsequent dangerous inflammation. This heat may be applied, by attaching a platina point to the end of a copper or iron wire, then, by bringing the two poles of a galvanic battery to act upon this point, a heat will be obtained of sufficient intensity to destroy all animal tissues to which it may be applied, without any great degree of suffering. I have used this successfully in fistula in ano, and in urethral stricture.

Occasionally, instances of a RUPTURE OF THE UTERUS are met with, which generally prove fatal. This accident may occur during pregnancy, or at an advanced period of life, but it is only of its existence during parturition that I shall treat. It is stated to occur about once in 1318 cases of labor.

Rupture of the uterus occurs more frequently among multiparæ, and especially, it is stated, with male fetuses, who are usually larger than females; it may be owing to several causes, as, debility or disorganization of the uterine tissue, effected by inflammation during pregnancy; cases of thinning, softening, scirrhus, and gangrene of the uterine walls, have been recorded. An abnormal size of the fetal head, may be a cause; as well as obliquity, or retroversion of the uterus—transverse presentation of the body, or the head presenting obliquely at the superior strait; the presence of a polypus; an excess of liquor amnii; and plurality of children, have all been named as causes. It may occur from violence, as falls, blows, kicks, etc., forcible attempts at delivery by turning or otherwise, and has been known to follow a fit of anger. A cicatrix in the os and cervix uteri may tend to its occurrence. A rigid os uteri may occasion it, and instances have been observed where the os has been entirely torn off; females who have deformed pelves, or those on whom the Cesarean operation has been performed at a previous labor, are very liable to it. Violent efforts of the uterus itself, and especially when induced by the exhibition of ergot, or stimulants, will tend to lacerate the organ.

Among these enumerated causes, probably, those which more frequently give rise to the accident, are morbid alterations in the uterine tissue; violent contractions of the uterus; a forcible entrance through the undilated os; and undue violence in turning, or otherwise assisting the delivery; though, it may occur during the operation of turning, from some diseased state of the cervix, the operator being blameless.

The rupture may happen at any part of the uterus, though it is most frequently met with at the cervix, either anteriorly, opposite the pubes, or posteriorly, opposite the sacral promontory, and generally at the point complained of by the patient as being excessively painful. Its direction is not constant—with some it may be longitudinal, and with others oblique or transverse; and it may be accompanied with a laceration of the vagina.

Its occurrence may be sudden, or it may take place gradually; and the laceration may be complete, extending through the uterine texture and its peritoneal covering; or, partial, being confined only to the peritoneum, or to the muscular texture.

SYMPTOMS.—Rupture of the uterus most frequently follows a powerful effort of contraction, during which the female suddenly screams that something has ruptured within her. The pain accompanying this sensation is very acute and agonizing, and is frequently expressed as “a crampy pain;” and it is the intensity of this which causes the shrieks of the patient. Frequently the rupture is manifested to the bystanders by a tearing or cracking noise.

The pains soon become feeble, or cease immediately, according to the complete or incomplete nature of the rent, and a violent, constant, excruciating pain, entirely different from that caused by uterine contraction, is most generally complained of, as being confined to one spot.

The pulse soon becomes rapid, small, feeble, and fluttering; the countenance quickly assumes a pallid, anxious, and alarmed appearance; the respiration becomes hurried and difficult; the surface is cold and clammy; violent retching ensues, with vomiting of mucus, a greenish matter, or a dark-colored substance resembling coffee-grounds; there is faintness, with an inability to lie, requiring the female to be raised in the bed; external or internal hemorrhage may occur, but the flooding is frequently absent, there being but a slight discharge of blood; and sometimes convulsions happen.

Should the peritoneal coat only be rent, the labor may go on, and the child be delivered; and, occasionally, the last pains which expel the child, may at the same time effect a complete rupture of the uterus.

DIAGNOSIS.—In connection with the symptoms above named, an examination, externally, will discover the uterus contracted in one or the other iliac region, and the child may be plainly detected, through the abdominal parietes, when the rupture is complete. An examination *per vaginam* will ascertain that the presenting part has receded so as

barely to be felt by the finger, unless it be impacted, or, it may have passed entirely out of reach, the child having escaped into the cavity of the abdomen. The death of the fetus generally happens immediately, so that if the fetal pulsations can be heard, it is considered indicative of no rupture. A partial rent is of more difficult diagnosis; we must be guided by the pain, and the collapsed condition of the patient.

PROGNOSIS.—The prognosis is always serious, as very few ever recover from the accident. The shock may destroy the patient immediately or in a few hours after the rupture; if the collapse does not prove fatal, she may die subsequently of peritonitis, or, secondary affections may finally destroy her, as lumbar abscess, sub-peritoneal abscess, etc. Even slight lacerations of the os uteri have proved fatal. If the peritoneal coat be not ruptured, there will be danger of peritonitis. Metritis will be apt to follow a laceration of the muscular tissue.

Although the fatality attending this casualty is very great, still, cases are recorded in which recovery has followed, and even where children have been given birth to, subsequently; so that in no case is the practitioner to abandon it as irrecoverable—his duty is to use every effort to save his patient.

TREATMENT.—In a labor where, from the violence of the pains, or the presence of a fixed, crampy pain, or other well-founded reason, rupture of the uterus is apprehended, the delivery should, if possible, be hastened—but not by Ergot, or stimulants. It would also be advisable to moderate the pains by the agents heretofore named, as Sp. Trs. of Gelsemium, Aconite, etc. The forceps should be employed when safe and practicable; but if the child be dead, and any resistance be offered to its advance by the forceps, the perforator should be used. Counsel should always be sent for.

If the rupture has occurred, the only chance for the patient is in immediate delivery. If the head be within reach, the child may be cautiously extracted with the forceps; or, if this can not be effected, then the perforator must be used, taking especial care, with either instrument, not to push up the head, lest it slip through the rent into the abdominal cavity. This may be avoided by an attendant making pressure over the fundus, and the operator causing the perforation to be gently made in a direction, as much as possible, toward the sacrum. Should the presentation be of the shoulder, or the face, or the nates, bring down the feet, and thereby hasten the expulsion, as well as pre-

vent the child from passing into the abdominal cavity. The child being delivered, follow the cord, and carefully remove the placenta.

If the child has passed into the ventral cavity, the hand and arm should at once be oiled and insinuated steadily along the vagina, into the uterus, and through the rent into the cavity of the abdomen; the feet of the child should then be seized and brought down, extracting it through the ruptured opening into the uterus and delivering by the natural passages. This accomplished, reintroduce the hand, if necessary, to remove the placenta. But in either case, be especially careful not to abstract any portion of the intestines along with the child, or placenta; and if any part of them has entered the fissure, remove them, that they may not be strangulated by the subsequent contraction of the uterus. Make no attempts, however, toward their proper replacement; when remaining within the abdomen any interference to adjust them is improper.

But the os uteri may not be dilated, or not sufficiently so for the introduction of the hand, or, after the child has escaped through the rent, the uterus may contract—in either case—rendering delivery by the natural passages impossible; what must be done? It is advised by eminent authority, that if the female has not suffered much from the shock, and other circumstances are favorable, to explain to her the nature of the accident, and with her consent, perform the Cesarean section, and remove the child and placenta through the abdominal parietes. If, however, she be rapidly sinking, or half an hour has elapsed and the fetus is dead, leave the case to nature. The practitioner will, however, be guided by circumstances, everything will depend upon his judgment aided by that of his counsel, and no safe means must be left unemployed which may tend to preserve both mother and child.

While the patient is in a collapsed condition, various agents may be given to arouse the vital energy, and prevent it from becoming too far depressed. Alcoholic stimulants, as well as Ether, Ammonia, etc., should be given freely; also apply stimulants externally.

After the delivery, when all indications of collapse have disappeared, to diminish nervous excitement, Opium, Morphia, compound powder of Ipecacuanha and Opium, Hyoscyamus, or other anodyne may be given. The subsequent inflammation, if excessive, must be met by Sp. Trs. of Aconite, Gelsemium, Macrotys, Pulsatilla, Phytolacca, etc., which should be exhibited in sufficient quantity to diminish the severity of the inflammation, but not to overcome

it entirely, for a certain amount of inflammatory reaction is required for a cure. Severe inflammatory reaction may induce (dangerous) peritonitis, to which, indeed, the patient is very liable, and which should constantly be borne in mind. The strength of the system must be supported. Poultices or fomentations of Hops and Stramonium leaves, or the old time Spice Poultice (*Am. Dispensatory*) over the abdomen, will also be found of much benefit when symptoms of peritonitis are present.

The VAGINA MAY BE LACERATED, in connection with the uterus, or independent of it; it is more unfrequent than uterine rupture. The symptoms resemble those of rupture of the uterus, and are nearly as dangerous. If the laceration be trifling, it is better to leave the case to nature, watching it carefully, however, and bestowing some care to the support of the perineum, as the head passes over it. If there be danger of an extension of the laceration, hasten the delivery, by forceps if possible. The after-treatment will be similar to that in the preceding accident.

RUPTURE OF THE BLADDER, is a more fatal occurrence than that of the uterus, it is extremely rare, and may arise from neglect or inattention of the practitioner, or the improper use of instruments. Its symptoms are somewhat similar to those of rupture of the uterus, as a violent and severe pain in the region of the bladder; a scream from the patient; a sensation of something having given away internally; rapid depression of the vital powers; tumefaction and tenderness of the abdomen; but no recession of the presenting part, or distinguishing the child in the abdomen. The contractions of the womb continue, but grow weaker as the system sinks.

This accident may be prevented by proper care on the part of the practitioner, who will ascertain that the organ is emptied during labor, or if it be full, and the patient can not void the urine, he must introduce a flexible catheter and thus effect the evacuation. When the rupture occurs, the child should be saved, if possible, there being but little hope for the mother. The delivery should be hastened by turning, or the forceps, if the child be alive; and if this can not be effected, the Cesarean operation has been advised. The death of the child usually ensues in consequence of the prostration of the mother.

SYNCOPE, occasionally attacks females either during labor, or subsequently thereto, and may occur independently of hemorrhage, or rupture of the uterus, vagina, or bladder.

Those of a nervous, hysterical, delicate habit, are more liable to it, though it is also met with among those who have prostrated the energies of the system by intemperance, or unhealthy diet with impure air. It may also be occasioned by some organic disease, as of the heart and lungs, or from the rupture of an aneurism, or abscess, in which instances it may prove fatal. It also undoubtedly occurs from the sudden removal of the pressure of the contents of the gravid uterus upon the abdominal viscera and large vessels of the body. Females of a despondent or gloomy state of mind, or who are apprehensive concerning the termination of their labor, are also subject to it.

A prudent exhibition of Wine, Ether, Ammonia, or other stimulants, to invigorate the energies of the system, with moderate warmth, fresh air, depression of the head and shoulders, a sprinkling of Ammonia or Camphor upon the face and neck, and frictions to the extremities, will commonly be sufficient to restore the patient. Sulphate of Quinia, or, Fluid Extract of Erythroxylon Coca, will also be useful. Of course, when the symptom happens from organic difficulty, the probability of rallying the female will depend upon the character of the disease. When it occurs after the delivery, in addition to the above means, apply friction to the abdomen, together with a broad bandage firmly and properly applied.

Sometimes an extravasation of blood into one or both of the labia pudendi, suddenly occurs during labor, or shortly after the birth of the child, which is termed **THROMBUS**. It is the result of a rupture of varicose veins of the vagina, or of some of the large blood-vessels.

The affected labia present the appearance of a livid or black tumor, of greater or less size, frequently as large as the head of a child, being accompanied with intense pain.

Dr. Dewees states, that if the inner surface of the attacked labium does not burst in the first instance, the tumor is certain to yield in a short time from gangrene. A large surface of coagulated blood becomes exposed when the part sloughs, which rapidly decomposes and becomes fetid. If the parts do not rupture, the patient suffers most excruciating pain: active fever takes place with delirium, and her life becomes seriously endangered. A retention of urine increases her sufferings, and relief can only be obtained by making a free incision on the mucous face of the labium, to allow the extravasated blood to escape, and which should be done before the process of ulceration has commenced, or the chance of bursting. Then press the

enlarged labium to one side, and evacuate the bladder by means of the catheter.

Thrombus is most commonly present in cases of protracted labor caused by pelvic deformity, and generally proves fatal, especially if not attended to at an early period. Sometimes its progress is very rapid, the blood effused being so great in quantity as to cause syncope; or the mucous membrane may rupture, followed by a cessation of pain, and a hemorrhage, which may be so excessive as to rapidly destroy the patient.

These tumors must not be confounded with inversion of the uterus, or of the vagina, or with cystocele, vaginal hernia, etc.

TREATMENT.—If this difficulty happens during labor, and the tumor interferes with the passage of the head, it should be freely incised on the mucous surface (the extent of the incision being in proportion to the size of the swelling), and the fluid allowed to escape. Should it be, however, excessive in quantity, too great a discharge must be checked by applications of cold, ice, and compression, which must be continued until the engagement of the head, by pressing upon the ruptured vessels, prevents any further flow.

If the thrombus occurs during pregnancy, or after delivery, with only a small tumor, but little discoloration of the skin, and no perceptible increase of the effusion, and no fluctuation, attempts should be made to resolve it, by the application to the parts, of cataplasms of Elm and Arnica flowers, or Elm and flowers of St. Johnswort, aided by warm fomentations to the hands, feet, and legs. And the same course may be pursued after delivery, when the tumor ceases to enlarge, carefully watching, however, and opening it, upon the first appearance of inflammatory symptoms.

If the tumor continues to increase, with debility and sinking of the system, incise it, as before named, evacuate at least the greater part of the clots present, by the fingers, and then make firm and permanent compression upon the whole tumor, together with applications of ice or styptics, if the effusion does not readily cease. As profuse hemorrhage, or severe inflammation may subsequently supervene, the practitioner should be fully prepared to encounter them.

Always sustain the strength of the patient by appropriate stimuli, nourishing diet, etc.; and keep down febrile symptoms by the proper administration of the indicated sedatives, together with such other agents as are specifically indicated or peculiarly adapted to the conditions present. Keep the bowels regular, enjoin quiet, the recum-

bent position, and cleanliness of the parts, and do not suffer the bladder to become overdistended with urine. The Sp. Trs. of Gelsemium, with a small proportion of Aconite added, or the application of Tr. of Veratrum Vir., will prevent any subsequent attack of erysipelas, or peritoneal inflammation, in many instances.

CHAPTER XLI.

COMPLICATED LABOR—PUERPERAL CONVULSIONS—ECLAMPSIA— HYSTERICAL CONVULSIONS—APOPLEXY—EPILEPSY.

ONE of the most dangerous and frightful maladies, with the exception of inversion and rupture of the uterus, with which the puerperal female may be attacked, is CONVULSIONS (*Eclampsia puerperalis*). It usually occurs during labor, though occasionally met with for some time previously, but seldom before the sixth month of pregnancy; and it frequently manifests itself after delivery, when it is generally, but not always, of a more favorable character.

According to statistics, it is fortunately a rare disorder, having occurred in 172 cases of labor, out of 103,537; or about 1 in 602. Primiparæ are more subject to it; instances, however, have presented of multiparæ who were attacked by it in their tenth or twelfth labors. The fatality of the mother, heretofore, has been about one in every four; most commonly the children are still-born. Females with short, thick necks, of low stature, and square form, and of a sanguine temperament, are considered to be more subject to it—yet none are entirely exempt from it. It frequently attacks those who, in early life, suffered from epilepsy, hysteria, or who have received injuries of the head.

Beside the true puerperal convulsions, there are three other varieties which may attack the parturient female, viz.: the *hysteric*, the *apoplectic*, and the *epileptic*, each of which will require a separate notice.

HYSTERIC CONVULSIONS, with their treatment, have been referred to under the Diseases of Pregnancy. A few inhalations of Chloroform will likewise frequently remove them. It may be proper, however, to name the distinguishing marks between these and the true puerperal convulsions.

IN HYSTERIC CONVULSIONS.

1. Consciousness may, or may not be entirely lost; generally the insensibility is incomplete. A dash of cold water upon the face and chest will often restore the patient, and will at least make her start. If labor pains are on, they will cause her to wince, and an attempt to make an examination will be opposed.

2. The spasmodic action is moderate, the body being but slightly contorted.

3. No frothing at the mouth, and no biting the tongue.

4. The breathing is not stertorous nor hissing.

5. The convulsive attacks are not frequent, the patient recovering shortly after each.

6. There may be sobbing, sighing, weeping, and screaming.

IN PUERPERAL CONVULSIONS.

1. Consciousness is completely lost.

2. The spasmodic action is violent, with powerful and irregular agitation of the muscular system.

3. Frothing at the mouth, with biting of the tongue.

4. The breathing is rapid and violent, with a loud, peculiar, hissing sound.

5. The paroxysms are frequent, with total insensibility, or incomplete consciousness during the intervals.

6. Sobbing, sighing, weeping and screaming, are never present.

APOPLECTIC CONVULSIONS, when present, almost always, with but a few exceptions, occur toward the termination of labor; and are caused by the pressure exerted upon the cerebral vessels during the contractions of the uterus. They are rarely met with, and most usually prove fatal.

Sometimes no premonitory symptoms will be present; at others, there will be pain, and throbbing, with other disturbance of the head, for several days previously. During labor, there will usually be more or less headache, and in the expulsive stage, the countenance will be flushed, with a fullness of the vessels of the eyes. There will be some agitation of the limbs and body, with but little spasmodic action; seldom any distortion of the face, no frothing at the mouth; the pulse is full and slow, and the pupils fixed, and either contracted or dilated, and insensible to light. The breathing is stertorous; the muscles soon become flaccid and powerless; the patient lies in a comatose condition, and very rarely has a second paroxysm.

The following are the marks of discrimination between these and the true puerperal convulsions:

IN APOPLECTIC CONVULSIONS.

1. The convulsive movements at the commencement are slight, and are not repeated, the unconsciousness being persistent. Sense and sensibility are completely lost.

IN PUERPERAL CONVULSIONS.

1. The convulsions are violent and are repeated, with intervals of quiet, and often a more or less complete return to consciousness.

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| 2. The breathing is stertorous. | 2. The breathing is violent, with a loud, hissing sound. |
| 3. The muscles become flaccid and powerless. | 3. The muscles preserve their tone, even during the intervals. |

PATHOLOGY.—The brain will occasionally be found much congested, without effusion ; sometimes, the pressure of a great effusion of serum causes the attack ; more commonly, blood is poured out into the substance of the brain, or at its base. It is almost impossible to distinguish the congestive form from that caused by effusion ; the principal difference exists in the intensity of the symptoms. (*Churchill.*)

TREATMENT.—Prompt and energetic measures can alone be of service in these cases. In cases that prove fatal, external stimulating measures will not be responded to by any reflex action. Cold water, or ice should be applied to the head and neck, a brisk purgative enema, to empty the lower bowels, should be given as soon as it can be prepared, and warmth and friction should be applied to the inferior extremities and lower half of the trunk. In the application of the water, the head should be withdrawn carefully from the bed, and held over some large vessel to receive the fluid after it has been poured on. If no effect is produced by these measures, active counter-irritation to the occiput and neck may prove valuable. If the attack occurs during labor, the delivery should be hastened as speedily as may be done with propriety, but always without force or rudeness.

The above measures should be persisted in for some time. If a return to consciousness follows, administer a purgative as soon as the patient can swallow, apply warmth and counter-irritation to the extremities, and keep the head cool. Always be certain that the bladder is evacuated, and does not become distended.

EPILEPTIC CONVULSIONS do not vary in their symptoms and treatment from those of ordinary epilepsy ; they very rarely occur with parturient females, unless they have had previous attacks, and are subjects of the disease. But epileptic females are not more liable to puerperal convulsions than others. The symptoms of epilepsy so much resemble those of eclampsia, that it would be impossible to distinguish between them in the parturient female, unless we were apprised of the fact that she had previously been subject to epileptic attacks. And even then, our diagnosis might be incorrect, for the reason that an attack of epilepsy, occurring at this time, might be converted into a true eclampsia. As epilepsy may, however, when manifested during

labor, be mistaken for the true puerperal convulsions, it may be proper to name some of the marks of discrimination between them

IN EPILEPTIC CONVULSIONS.

IN PUERPERAL CONVULSIONS.

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| <ol style="list-style-type: none"> 1. The <i>aura epileptica</i> is observed. 2. There is usually but one paroxysm; or where there are several, they do not succeed each other rapidly. 3. The patient has generally had previous attacks. | <ol style="list-style-type: none"> 1. The <i>aura epileptica</i> is never observed. 2. There are almost always several paroxysms, rapidly following each other. 3. The patient has never been attacked with epilepsy before. |
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TRUE PUERPERAL CONVULSIONS appear to partake both of the nature of epilepsy and apoplexy, and are considered by many eminent writers as veritable apoplexy with violent spasmodic paroxysms superadded, the latter being occasioned by the great degree of nervous excitability to which all pregnant and parturient females are liable.

The causes of puerperal convulsions are not well understood; they appear to be multiform. Plethora, compression of the aorta, long-continued mental excitement, highly electrical conditions of the atmosphere, persistent damp, foggy weather, profuse hemorrhage, and previous diseases or injuries of the head, have been variously named as predisposing causes. Females, not married, who do not enjoy the pleasures of society, and particularly who are given to the use of liquors, are especially liable to them. It has also been supposed, that blood poisoning, from a retention of urea, occurring, either from the presence of Bright's disease, or from pressure upon the emulgent veins by temporary congestion upon the kidney, has occasioned the paroxysms. According to Dr. Lever, albuminous urine and puerperal convulsions are frequently met with together, very few cases of the latter occurring which do not give evidences of the presence of albumen. Athill states that "it is proved beyond all manner of doubt, that in the immense majority of cases, in at least 90 per cent., albuminous urine and puerperal convulsions are synonymous terms." M. Bouchut holds to the opinion that the cause of eclampsia is encephalo-pathic albuminaria occasioned by serous effusion of the meninges of the brain, or, by uremic or ammoniemic poisoning through secretory insufficiency of the kidneys. There is no doubt but there are cases in which the convulsions are wholly post partum, the exciting cause being a septicæmic contamination of the blood.

Twins, excess of the amniotic fluid, death of the child, distension of the bladder, irritation of some part of the alimentary tube, indigestible food, severe labor-pains, rigidity of the os uteri, irritation of

the uterine nerves by the introduction of the hand, terror, or violent mental impressions, etc., have all been viewed as exciting causes. Most probably, however, the nervous system of some organ, as the uterus, stomach, bladder, etc., transmits the irritation, which has been occasioned by some derangement of its functions, to the spinal system and the brain.

According to Churchill, Dr. Tyler Smith, "has proved that convulsions are not excited by irritation of the cerebrum alone, but by the primary or secondary effects produced upon the spinal marrow, medulla oblongata, or tubercula quadrigemina. And therefore that the causes giving rise to convulsions may be either, 1, *Centric*, such as pressure on the medulla oblongata from congestion, coagula, or serous effusion within the cranium; loss of blood, morbid elements in the blood; emotion. Or, 2, *Eccentric*, acting on the extremities of the excitor nerves, as irritation of the incident spinal nerves of the uterus and uterine passages; irritation of the excitor nerves within the cranium; irritation of the incidental spinal nerves of the rectum; irritation of the ovarian nerves; irritation of the gastric and intestinal branches of the pneumo-gastric nerve; irritation of the incidental spinal nerves of the bladder; and as probable causes, irritation of the cutaneous nerves, of the nerves of the mammæ, and of the hepatic and renal branches of the pneumo-gastric. More than one of these causes may, of course, act at the same time."

Rosenstein, of Groningen, has made some very interesting and useful researches as to the relation between carbonate of ammonia and uremia; he has ascertained that the first only excites epileptiform phenomena, and that narcotics are of no use whatever. In uremic poisoning, various symptoms may be produced, convulsions, delirium, coma. But should the uremia determine epileptiform attacks, and carbonate of ammonia be found in the blood, we must not accuse this last, because it is not always found at first in such cases, and because the quantity found in the blood is not in relation with the intensity of the epileptiform phenomena. Again, the symptoms occurring in affections of the bladder or prostate, termed "ammoniemia," are in no way associated with poisoning by carbonate of ammonia, the epileptiform symptoms occasioned by the latter being wholly wanting in the former. *Arch. f. Path. Anat.*, V. lvi: 3.

Although all females are liable to attacks of this disease, yet those who labor under any of the following conditions, are supposed to be more disposed to it, and should, therefore, receive the earliest attention of the medical man, in order to prevent its attack: corpulent females,

those having short necks; those having firm, solid, and unyielding tissues, or who possess great muscular strength; those whose feet and hands swell, and who experience a numbness in the hands, or in the limbs, with swelling of the face, on awaking every morning; those who feel excessively weak, or who labor under partial or complete loss of sensation in one side of the face or limbs; those who are subject to headache, dizziness, *muscæ volitantes*, dimness of sight, double vision, seeing only one-half of an object, or flashes of light within the eyes; those who experience loud noises in the ears, especially when occurring suddenly, or who feel as if the head had received a violent blow. Anæmic females, and those who constantly complain of headache during the last month or two of gestation, should receive especial attention.

The proper course by which to prevent an attack in such females, no albumen being detected in the urine, is to keep the bowels and kidneys regular by laxatives and mild diuretics; attend to the surface by occasional bathings, with frictions and the use of a proper amount of clothing; regulate the diet, that it be nourishing, but not gross nor too stimulating, and agrees with the stomach, readily undergoing digestion. Exercise moderately but regularly in the open air, and have all sources of mental anxiety or agitation removed. In addition to these measures, strengthen the uterine nervous system by the exhibition of the Parturient Balm, *Macrotys*, *Pulsatilla*, *Gelsemium*, *Lobelia*, either singly or in such combinations as may appear the best adapted to each particular patient. The preparation first named will be found applicable to the greater number of cases. Small doses of some chalybeate preparation should be given, in conjunction, to anæmic patients. If there are serious infiltrations, diuretics may be given, as, the officinal infusion of *Digitalis*, together with saline draughts, as *Seidlitz* powders, *Acetate of Potassa*, etc.

In all cases where the accoucheur is, for several weeks previously, aware that he will be the attendant of a woman during labor, he should from time to time examine her urine, to determine whether albumen be present, and urea be diminished in amount, or be wholly absent; and these examinations are more especially demanded in primiparous women, those with short necks, where there is a condition of fullness or plethora, œdema, and where the woman complains of headache or giddiness. If, in the last month or two of pregnancy, there is headache, œdema, impaired vision or hearing, vomiting, pain in the epigastrium, or nervous symptoms, the albuminous urine being scanty, turbid, high-colored, containing granular

or hyaline casts, but no blood or epithelium, the albuminaria is due to compression of the emulgent renal vessels by the enlarged uterus; and the urine will tend to resume its normal character after parturition. But, if the scanty and albuminous urine exists at an early period of pregnancy, before the size of the uterus can exert any pressure, and contains blood and epithelium, there is, undoubtedly, acute desquamative nephritis.—*Johnson*.

When albumen has been discovered in the urine of a pregnant woman, she should at once be placed under treatment. Cathartics, such as do not affect the uterus, should be employed, as, Cream of Tartar, Rochelle Salts, etc., which, without depressing any, should be kept up regularly until full term. The skin should be kept in a stimulated condition by hot air baths, or applications of warm water, followed by drying with a coarse towel, using enough friction to produce a glow upon the surface; dry cupping and fomentations over the region of the kidneys are also required. These measures tend to relieve the kidneys, as well as to aid the system in its endeavor to remove the poison in the blood. Should any nervous irritability be present, such agents are indicated as Pulsatilla, Belladonna, Bromide of Potassium, Digitalis, etc. Where there is a swollen condition of the extremities, or a puffiness of the eyelids, Apocynum Can. should be administered. The diet should be chiefly vegetable and farinaceous, using fruits, berries, etc., when not contraindicated, and as little meats as possible. There will, in some cases, be a clear indication for acids, and by the judicious administration of Tartaric Acid, or Lemon juice, it is claimed, the carbonate of ammonia already formed in such conditions may be neutralized. By these means the woman may be entirely relieved and prevented from having a convulsive attack at full term.

In the very worst forms of uremic poisoning, in which the urine is rendered almost solid by the excessive amount of albumen present, it is advised to perform premature delivery at the seventh or eighth month, in order to save both the child and the mother.

SYMPTOMS.—The most violent puerperal convulsions may take place without any premonitory symptoms; but in the majority of cases they will be met with. For several days, or even weeks, previously, or perhaps for only an hour or two, the patient will complain of more or less severe headache; giddiness; dazzling of the eyes; weight and constriction across the forehead; beating of the temporal arteries; disturbance of the sight and hearing, or, perhaps, a sudden loss of

sight; double vision; ringing in the ears; rigors; flushed countenance; stammering, or incoherency of speech; confused thought or memory, slight delirium, and other indications of cerebral disturbance. Occasionally, pains will be felt in the region of the stomach. One or more of these symptoms are premonitory warnings of an attack, and when they exist demand prompt attention from the accoucheur, who must at once endeavor to prevent the paroxysms by appropriate measures, as heretofore explained.

No relief being had, the symptoms become aggravated until the attack occurs. The face now becomes more flushed and swollen, the eyes fixed, and the pupils dilated [*cerebral anaemia*, as the rule]; though occasionally cases will be met with in which the pupils contract closely [*cerebral congestion*, as the rule]. The patient rapidly becomes unconscious. The voluntary muscles of the system become violently and irregularly convulsed. The head is rotated by jerks from right to left, or backward, the back of the neck and spinal column also tend backward (*opisthotonos*), and the limbs are thrown with spasmodic violence in every direction, requiring powerful efforts to keep the female in bed. The muscles of the face are commonly affected first; the eyes roll rapidly about, being frequently thrown upward and inward to the root of the nose, and irregular convulsive twitchings may be observed about the mouth and eyelids. The lower jaw becomes firmly and spasmodically closed against the upper, or it may be drawn to one side. The tongue is involuntarily protruded, and is generally of a livid color, and if some care be not taken, the spasmodic closure of the jaws will severely wound it, so that the frothy saliva which is blown from the mouth, sometimes to a considerable distance, will be tinged with more or less blood; this may be frequently prevented by placing a cork between the teeth as soon as they become separated. The breathing is rapid, irregular, and violent, and is accompanied with a loud, peculiar hissing sound, owing to the presence of froth and the compression of the lips and teeth. The pulse varies, but is generally quick, full, and hard, at the commencement, but finally becomes slow and hardly perceptible. The face is distorted by the spasmodic contractions, and becomes turgid and livid, and in which color the hands and feet, as well as the body, participate. Frequently the contents of the bladder and rectum are involuntarily evacuated.

Occasionally, the muscles of one side of the face and body are only convulsed, but, as the spasms cease, those of the opposite side become affected.

After a certain length of time, varying from a few minutes to half an hour, the violence of the convulsive motions diminish and gradually cease altogether; the features begin to appear more natural, the pulse is still quick but more readily discernible, restoration of the circulation takes place, and the breathing becomes more regular. Consciousness slowly returns in a greater or less degree; the female, wakening, apparently, as if from a sleep, may be aware that something uncommon has occurred, or, as is more generally the case, she may have no recollection whatever, her mind being more or less confused. Pain in the head is nearly always complained of. After an interval of quiet, varying from fifteen minutes to two or three hours, the paroxysms return, when the same phenomena take place as before, followed by another interval; and thus the paroxysms and intermissions follow each other, until they cease entirely. I met with one female, in my early practice, who had sixteen paroxysms in as many hours. Very frequently, in these convulsions, the consciousness returns very slowly, and immediately upon its first manifestation a paroxysm comes on.

Consciousness does not, however, return in all cases; not unfrequently the patient, during the intervals, remains motionless and insensible, with stertorous, or hissing respiration, somewhat resembling coma or asphyxia, and which may soon prove fatal; or she may be unconscious and restless, throwing herself about in the bed, until the next convulsive paroxysm, as in the apoplectic form eclampsia.

Most commonly the duration of the convulsion does not exceed five or ten minutes, while the intervals may extend to even twelve hours in some cases, and but a few minutes in others.

When convulsions occur in the pregnant female, it is seldom that she will complete the full term, and the child will be still-born, and frequently putrid; probably the paroxysms may at times be caused by the dead child acting as a foreign irritant to the uterus, its death having taken place previous to the attack. Occasionally the spasms cease spontaneously, without endangering pregnancy; but more frequently uterine contractions are aroused, which generally expel the child, and this may happen without any consciousness on the part of the mother.

If the convulsions come on before the occurrence of labor pains, at the full period, they usually cause dilatation of the os uteri; and the uterine contractions which may follow, will be feeble, irregular, and apparently spasmodic, often alternating with the convulsive paroxysm.

During labor, there may or may not be a suspension of the contractions of the uterus; but more commonly it participates in the general spasmodic irritability, and contracts powerfully, effecting delivery without the patient being aware of it. The paroxysm usually ensues just upon the return of uterine action, though not always with each pain. Generally, the ordinary character of the pains are not changed by the convulsions, and the labor proceeds regularly, unless hastened by art. Not unfrequently, however, the action of the uterus becomes inefficient, and the delivery must be artificially completed.

When puerperal convulsions occur during labor, they most frequently cease when delivery is effected, or soon after, unless they prove fatal; and the patient is generally left with a strong tendency to metritis and peritonitis.

Puerperal convulsions may terminate by recovery; by developing some other disease, as paralysis, cerebral lesions, mania, epilepsy, rupture of the uterus, metritis, peritonitis, etc.; or by death.

The recovery may take place rapidly, especially when the paroxysms have been few and of a mild character, or it may be tedious and for a long time uncertain; the intellectual faculties very gradually returning to their normal condition, the memory being excessively debilitated or destroyed, as well as the hearing and sight. This derangement may continue for a day or two, or may extend to several months before complete restoration takes place.

When other diseases are occasioned by the convulsions, the patient may ultimately recover, but generally with impaired health for the remainder of her life; and frequently these diseases contribute to a more or less speedy fatality. Death most usually occurs when the paroxysms are of great intensity and long duration, with short intervals between them, and especially in those cases where the female remains motionless and unconscious during the intermissions. It may be caused by effusions on the brain, or by a too prolonged and complete suspension of respiration; also by a rupture of the uterus.

The above description of symptoms, together with the preceding tables for distinguishing the attack from hysteria, apoplexy, and epilepsy, will render it unnecessary to detail any further *diagnosis*.

PROGNOSIS.—This is undoubtedly an extremely fatal disease, the most favorable statistics showing that one-fourth of those who have been attacked by it were lost. But the practitioner may generally be enabled to form a prognosis, somewhat approximating positiveness, by ascertaining, if possible, the cause that produced the attack, and by

observing the period at which it occurs, and the progress and character of the symptoms.

If the paroxysms are very severe and of long duration, the intervals being short, and no return of consciousness, the patient lying in a state of stupor, with stertorous breathing, she will be in a very critical situation, and more especially if she be insensible to the application of stimulants. The longer the duration of the intervals, and the more perfect and rapid the return of consciousness, the more favorable will be the case, notwithstanding the severity of the paroxysms. And the milder the convulsions, with the last named character of intervals, the less will be the danger.

Females whose nervous systems are extremely susceptible, who are hysterical or subjects of epilepsy, or whose minds are very sensitive, are less apt to have formidable attacks than those who are disposed to apoplexy or coma, or who are laboring under serous infiltrations.

Convulsions occurring during pregnancy, or during labor, are more dangerous than those which take place only after delivery; and when they occur early in labor, before the parts are sufficiently dilated to admit of the ready expulsion of the uterine contents, they are less favorable than toward the termination of the delivery, when this may be effected either naturally or artificially. They are likewise more fatal among primiparæ.

When the convulsions come on during the last stage of labor, and continue equally strong after the delivery, whether this has been effected naturally or artificially, the case is extremely dangerous; but if the patient falls into a gentle sleep, with an arrest of the paroxysms, after the expulsion of the uterine contents, they seldom return, and convalescence ensues. After the delivery and the disappearance of the convulsions, the practitioner must carefully watch the patient, in order to guard her against any subsequent abdominal inflammations, more especially if puerperal peritonitis be, at the time, a prevailing complaint.

The maternal disorder necessarily exerts an unfavorable influence upon the child, and we find that the major part are either still-born, or die in a few days after birth of convulsions, having, probably, while in utero, received the germ of the disease through the mother's blood.

M. Bourneville, who has investigated this subject, states that in *uremic poisoning*, there is a progressive and considerable lowering of the temperature, which increases as death approaches, and which attains its maximum when this occurs, even to 41° ($105^{\circ} 8' \text{ F.}$); while

in *puerperal eclampsia* the temperature continues to rise from its commencement to its termination, during coma, and in the intervals between the paroxysms, diminishing only with the disappearance of the attack; descending at the moment of death even to $28^{\circ} 1'$ ($82^{\circ} 5' F.$). If the coma diminishes in eclampsia, or ceases entirely, and the temperature subsides, the prognosis is favorable, and *vice versa*. In cerebral hemorrhage, there is at first a lowering of the temperature, followed by an elevation. Epileptic attacks elevate the temperature, which is not effected by hysteria. However, further investigations are required.

PATHOLOGY.—Post-mortem examinations have shed but little light upon the nature of puerperal convulsions, no appreciable anatomical lesions having been found—no traces of injection nor changes in the character of the tissues.

Sometimes a serous effusion has been observed in the ventricles, or arachnoid cavity, and perhaps a slight congestion of the encephalic vessels; but these are viewed as secondary lesions, being merely the effects of the convulsions, when the cerebral congestion is very great. The heart is commonly empty and relaxed, the lungs pale, and occasionally fluid has been met with in the pleura, or pericardium; traces of peritoneal inflammation have likewise been observed.

In considering the cause of this disease, and the morbid conditions resulting therefrom, the words of Leishman might be quoted: "That albuminuria and puerperal eclampsia are mutually dependent upon each other, or, at least, are of simultaneous occurrence in the vast majority of all cases, is an assertion not likely, in these days, to be seriously controverted. But it is by no means agreed, as to the albumen and the paroxysm, which is the cause and which the effect. According to Braun, and those who support his views, the albumen appears in the urine as the result of that inflammatory affection of the kidney commonly known as Bright's disease. As a result of this, the blood is poisoned with excrementitial elements of the urine, and especially with urea. The experiments and researches of Frerichs have conclusively shown that the presence of urea in the blood, even in considerable quantity, does not give rise to eclampsia; and the conclusion which he has reached is, that the active poison is the carbonate of ammonia, produced, as he assumes, by the decomposition of the urea; which must, therefore, be acted upon by some particular ferment, the nature of which has yet to be discovered by the pathological chemist. Frerichs does not admit the essentially inflammatory nature

of the disease; at least, he appears to do so only to a limited extent, when he assumes, in explanation of the formation of the hyaline tube-casts, that the inflammatory theory can only hold good in so far as the exudation of blood plasma is connected with a paralytic dilatation of the capillaries. Braun, however, broadly maintains that the disease is of inflammatory origin, and that the nature of the morbid process is identical with that of Bright's disease.

"The other theory is that held by those who, while admitting the existence of albumen in the urine, as an essential phenomenon, assert that this is the effect of eclampsia, and not its cause—which is, by them, supposed to be the result of some blood disease, or of some blood poison hitherto unknown to science. And certainly the fact that, in so many instances, the convulsions precede the albuminuria, lends some confirmation to this view."

Lusk quotes Seyfert on this subject, in addition to his own views, as follows:

"1st. That convulsions may occur without albuminuria.

"2d. That the albuminuria is in many cases the effect and not the cause of the convulsions.

"3d. That in many fatal cases the kidney-lesions were absent or wholly insignificant.

"4th. That convulsions are rare in chronic Bright's disease, which had existed prior to pregnancy.

"5th. That in true uræmia, such as necessarily is produced by the suppression of urine when, in uterine cancer, the ureters are invaded, convulsions do not occur.

"That, in the main, these propositions are correct, hardly admits of question. But, in drawing conclusions from these, unnecessary stress is laid upon the presence or absence of albumen in the urinary secretion. It is the renal insufficiency, it should be fixed in the mind, and not the albuminuria, which causes uræmia and convulsions. The mere absence of albumen from the urine does not even exclude the existence of Bright's disease. Braun is careful to note that, in certain cases of fatal eclampsia, in spite of the absence of albuminuria, the *post-mortem* examination revealed amyloid degeneration of the kidneys and of the heart-structures; and again, in others, of atrophy of both kidneys, where the dropsy, and the albumen, and casts, which had been present earlier in pregnancy, had entirely disappeared at the moment the convulsions occurred. Bailly has shown that not rarely albuminuria in pregnant women may disappear for several hours, and

then re-appear once more; so that it is possible for an examination to be made during the short period when the urine ceases to be albuminous."

TREATMENT.—The indications of treatment in puerperal convulsions are, 1st, to subdue spasmodic action; 2d, to overcome cerebral congestion, and equalize the circulation; 3d, to hasten the delivery, when labor is on, by the most appropriate means, provided the paroxysms are not subdued; and, 4th, to prevent any secondary attacks, and gradually strengthen the patient.

For the fulfilling of the first indication, bleeding to the amount of from thirty to sixty ounces, and taken in a full stream from the arm or temporal artery, was the treatment formerly recommended; indeed it was *the remedy*, and the *principal remedy*, upon which the majority of practitioners at one time relied. Prof. King remarks that in former years he was in the habit of bleeding in these cases, and with various results; but, in an experience covering a large number of cases, he became thoroughly convinced that many of the unsuccessful cases could have been saved by different treatment, and that, in the successful ones, the bleeding effected but very little service. Many practitioners still adhere to this old treatment, and recommend it in the cases under consideration; but what benefit can any thinking man consider to be the consequence of excessive bleeding, when, at farthest, but only one out of every four patients is saved? Beside, those who are saved by these excessive depletions rarely have a complete restoration to health subsequently, but linger for a longer or shorter time, under some malady resulting from the bleeding, and which ultimately occasions their death. These large bleedings seriously injure the vital force, and, I believe, frequently prevent recovery where it might otherwise have taken place. The treatment which I shall now recommend to the profession, in puerperal convulsions, will be found fully as successful as the depletive one just referred to, and vastly superior to it, inasmuch as it does not cause any serious affections from sudden, excessive, and persistent prostration of the vascular and nervous systems.

The former treatment, used and recommended by the eclectics of the olden time, in puerperal eclampsia, consisted almost exclusively in the internal use of Gelsemium, and the compound tincture of Lobelia and Capsicum per rectum. This antispasmodic compound was also given in large doses internally, in cases where the patient was able to swallow. It was claimed that a paroxysm could be

frequently shortened in its duration by the administration of the compound while it was on; and that its use at such times did not contraindicate, nor interfere with, the employment of Gelsemium during the intervals, should this be deemed necessary. The continued use of the compound tincture of Lobelia and Capsicum, in this manner, was advised, until a positive influence had been exerted upon the muscular system of the patient, rendering it powerless, when its further use was not required, unless there should be a return of the paroxysm; however, the patient should always be placed under its relaxing influence as soon as practicable. Frequently, it is cited, this agent will not only overcome the spasmodic tendency of the voluntary muscles, but will at once relieve cerebral congestion, favor dilatation of the os uteri, and thus aid in hastening delivery when labor is on, and also prevent any disposition to subsequent abdominal inflammations.

Counter-irritation to the extremities was also a common adjunct to the old treatment, as well as the application of cups to the back of the neck and lumbar region, and ligatures to the thighs to prevent too much blood from being thrown into the trunk and head. This was the line of treatment pursued for years in puerperal convulsions; and while it would, no doubt, prove quite unsatisfactory to the majority of physicians of the present time, it, nevertheless, gave decidedly better results than bleeding—a popular treatment of the time with many physicians.

The present treatment does not include a large number of remedies; probably a half-dozen would include the entire list. Physicians vary in the selection of agents for the treatment of this, as in other diseases; each having a preference of one or two of the usual remedies that have given satisfactory results, and with which he successfully treats his cases.

I have always regarded Chloroform as deserving first place in the consideration of remedies—that is, during labor, the woman being in spasms. Administer it at once, to the extent of anesthesia sufficiently profound to produce relaxation and overcome spasmodic action. As soon as the convulsive action begins to subside, Morphia should be administered—a hypodermic injection of one-third to one-half grain, gradually substituting the Morphia for the Chloroform. If after the first, or even the second, injection of Morphia, there should develop symptoms of a return of the convulsions, again allow the patient to inhale the Chloroform as at first, repeating the Morphia every half to one hour until all indications of spasmodic action have disappeared.

By many, Morphia is believed to stand first among the remedies in puerperal convulsions, its action being direct upon the spinal center, and thus overcoming the perverted innervation. No doubt many cases are cured by the use of Morphia alone; however, my observation has been, where the convulsions are severe, with general spasmodic action, that quicker results follow the inhalation of Chloroform than the use of any other remedy; but it should, I believe, be discontinued as soon as the spasms can be held in subjection with other agents, and, for this second effect, Morphia hypodermically is the remedy that will give the most satisfactory results, and upon which I place the greatest reliance. This treatment, I believe, if given early, and persisted in, will overcome as many of the curable cases, in as short a time, as any other line of treatment that could be prescribed.

Chloral stands very high in the estimation of many as a curative agent in this trouble. Given in large doses, an anesthetic effect is claimed for it, and to this end it should be given, rather than in the usual dose as a sedative. M. Charpentier, after observing the results of bleeding, Chloral, and other anesthetics, as agents in the treatment of eclampsia, contrasts the effects as follows:

Mortality in cases treated by bleeding,	. . .	35 per cent.
“ “ “ anesthetics,	. . .	11 “

Chloral is often given with Bromide of Potassium. Several physicians of my acquaintance report the most gratifying results from the use of a combination of grs. xxx of each of these agents, administered per rectum, to be repeated according to the severity of the case, and the effect produced. Some practitioners, after quieting the convulsions in the beginning with Chloroform, substitute the Bromide and Chloral instead of Morphia.

In some cases the indication for Gelsemium appears to stand out clearly, and where the patient is able to swallow, it may be given with beneficial results. I have noticed the specific indications for this agent, it seems to me, more often in cases of eclampsia occurring after delivery, than at any other time. Desirable results might be obtained by administering it in combination with other remedies, in cases where it was especially called for.

Another remedy that was thoroughly tested, both in hospital and private practice, a few years since, was Tr. Veratrum Vir. It was supposed, by some of the more sanguine champions of this agent, that in it almost a specific for the disease had been discovered. As to the

action of Veratrum, Lusk quotes Dr. Kenyon, who says: "The drug is quickly absorbed, and enters the circulation rapidly. It enters the vasa vasorum, and through them impairs the sensibility of the vasomotor nerves, the blood-vessels thus losing their tonicity and power of contraction." It is claimed by most writers that very large doses are necessary, in administering Veratrum, in order to produce the effect desired; by some, fifteen drop doses every fifteen or twenty minutes is suggested; others claim that sixty to one hundred drops every thirty or sixty minutes will answer a better purpose. The toxic effect of the drug is manifested by vomiting—and which is usually provoked when pushed to the full dose. The poisonous effect is counteracted, it is claimed, by the morbid principle of the disease; thus the theory that large doses can be safely administered, and should be continued until vomiting is induced.

Physostigma may also be classified among the remedies to be thought of in the disease under consideration; its use, however, in this connection has been quite limited. It is a powerful spinal sedative, relaxing the capillaries and diminishing the circulation in the nerve-centers, and overcoming the active hyperæmia present with eclampsia. It would, no doubt, prove a valuable remedy in many cases. It should be further tested, and its action carefully studied. Prof. Scudder, in writing of Physostigma, says: "I used it in a case of puerperal convulsions, where other remedies had failed, with marked success." As to dose, he says: "The dose of the extract will be from one-sixteenth to the one-fifth of a grain; of a good tincture from one to ten drops."

As to bleeding, I shall give it no further consideration as a remedy, feeling that it should be ignored, in view of the several very excellent remedies we now possess, as well as the fact of the material decrease in the death rate since more rational remedial measures have been substituted for it.

Perhaps cups to the head, nape of the neck, and lumbar region, which have been advised by some, may be advantageously employed, but they can not be readily applied during the paroxysms, and during the intervals I would prefer the means already named. I have never used cups in this disease.

All these means will not be required in every instance, but when the convulsions are intense, with excessive cerebral congestion, the plan of treatment as suggested, or the selection of some of the other agents mentioned, should be promptly, energetically, and persistently

brought to bear upon the disease; and it must be truly a desperate case which can not be overcome by timely application. Of course, no cure can be expected where there is considerable effusion on the brain; but as we can not determine with positiveness whether this has occurred or not, we should be persevering in our efforts, however hopeless the case may appear.

During the continuance of the attack the bladder should be attended to, and evacuated by the catheter on the occurrence of an interval, if it becomes too much distended; and after the delivery of the child be careful that the placenta is not retained.

Frequently, during labor, when the child is delivered, the convulsions cease, and from a knowledge of this fact some writers have recommended the hastening of the delivery as a part of the treatment, even when the os uteri is rigid and undilated. Others claim that such interference is never justifiable, and the consequence has been, that more females have been destroyed by officious and forcible delivery than have been lost by leaving them to the natural resources of the system.

It is far better, says Blundell, that the woman should die convulsed in the hands of nature, than that she should perish by the cruel and savage operation of rough and unskillful midwifery.

Lusk, in closing the chapter on Puerperal Eclampsia in his work on obstetrics, offers the following:

“As convulsions which occur after the advent of labor have a tendency to recur so long as the labor continues, and in the larger proportion of cases cease after the birth of the child, every obstetrical resource compatible with the safety of the mother should be employed to hasten delivery. In the early part of the first stage, the pains, if sluggish, should be stimulated by catheterization of the uterus.

“Braun advocates rupturing the membranes, as he claims that the escape of the amniotic fluid often diminishes the frequency and violence of the convulsions. The water-bags of Dr. Barnes, if necessary, should be used to promote the dilatation of the cervix. * *

“After the first stage is completed, if no mechanical disproportion exists between the head and the pelvis, a careful attempt to extract the child with forceps should be made. Every precaution should be used to avoid injuring the soft parts. Obstetrical aid is only warrantable where it can be employed without detriment to the mother.”

When the accoucheur has faithfully employed the various means recommended for the removal of puerperal convulsions during labor, and no favorable impression has been made upon them after a reasonable time has progressed, he may then ascertain whether the condition of the parts is favorable for an artificial delivery; indeed, it is proper for him to examine from time to time while the fits last, lest the child be expelled unconsciously; also, to learn how the labor is progressing, and what may be the influence exerted upon it by the spasms. But he must be extremely cautious how he interferes with the delivery, lest his attempts prove more fatal than the disease. It is not always that the evacuation of the uterus is followed by a cessation of the convulsions; and not unfrequently these become aggravated by the attempts made to hasten the labor. When the female manifests periodically much uneasiness, moaning, and groping and writhing about, it is indicative of uterine contractions taking place; and when the head is at the perineum, she will frequently be observed to strain.

In a case where interference is indicated by the severity of the attack and its unyielding character, if the os uteri be found rigid, or soft and dilatable, but not fully dilated, the accoucheur may be able to aid the dilatation by sweeping the finger about the os, or by such other means as heretofore recommended; however, the effect on the patient, of such means, should be carefully watched. Convulsive action may be aggravated or increased by reflex excitation, the result of slight irritation—the effect, sometimes, of the finger coming in contact with the uterus. Consequently, if an attempt to promote dilatation should cause a return of the spasms, or other alarming symptoms, he must wait; he must be patient, until complete dilatation is nearly accomplished, when he may rupture the membranes—a course which frequently expedites the labor—but he must not attempt turning, even should it be a breech presentation: turning is a very hazardous measure in convulsions, but few females having recovered where it has been performed. Mal-presentations, according to the observations of accoucheurs, are very rarely met with in puerperal convulsions. If, however, the head be found in the pelvis, and within reach of the forceps, they may be immediately applied and the delivery terminated in this manner. But no attempts at artificial delivery must be made while the paroxysms are on, unless the patient lies in a motionless and comatose condition; else, irreparable injury to the soft parts may accrue, owing to the violent struggles of the patient: and should a fit come on during the application of the blades, they

must be immediately withdrawn, to avoid being forced through the walls of the vagina or uterus.

If the head be found steadily advancing, without any delay in its progress, artificial aid will not, as a rule, be required. Sometimes the head may be so firmly fixed in the pelvis as to resist all justifiable efforts to remove it with the forceps; here the perforator would be indicated, and should be used as heretofore advised, and if delivery by the forceps be impossible, operate without further delay. However, the judicious practitioner will be guided more by the circumstances of the case, than by any specific rules.

After the delivery, means to prevent any secondary attacks, and gradually restore the tone of the system, will be called for, when the convulsions have ceased.

Whatever may be the condition of the patient at this time—whether she complains of pain in the head or abdomen, or whether she be maniacal—the apartment which she occupies must be darkened, the greatest stillness must be observed, and every source of irritation removed, that she may be kept as quiet as possible. The lightest nourishment only should be permitted at first; afterward, as her strength improves, it should be more substantial, gradually increasing the diet as convalescence progresses. The bowels and bladder should be attended to, regulating the former either by injections or internal laxatives, as circumstances will allow.

Symptoms of secondary attacks may necessitate the continued administration of some of the remedies used in the beginning. An occasional dose of Morphia, may be called for. Sulphate of Quinia may be given in some cases. Gelsemium should be administered where there is jerking, or inclination to spasmodic action. Extreme nervousness calls for Pulsatilla. The indication for Rhus Tox. will sometimes be present also.

It will be well to use local antiseptic precautionary measures, as vaginal injections of Hot Water, in which has been dissolved a small portion of Chlorate of Potassium, or Borax. This should be repeated twice a day, until all danger has passed.

Dr. J. S. McClelland, in a recent paper on Puerperal Eclampsia, made the following report of treatment, mortality, etc., as gathered from a number of eclectic physicians:

“Of the twenty physicians to whom I sent blanks, thirteen responded. Those thirteen reported 7,190 births, with 28 cases of eclampsia; or 1 to 256.

"Of the 28 cases, 22, or nearly 80 per cent., recovered; and 6, or 20 per cent., died.

"Of the cases recovering, we find that six women convulsed during or immediately preceding labor; three at from six to eight months; two after labor was completed; and one as late as twelve hours after labor was completed; and in ten cases the time not given, but, from the above, it would be safe to say that four of the ten occurred during labor.

"Taking the fatal cases, we find that in five the convulsion came on before or during labor. In the remaining case the time that the convulsion came on is not given.

"Those physicians reporting fatal cases have, together, 21 cases of convulsions, of which nearly 30 per cent. died. One physician reported 1 fatal case in 7; one, 2 in 6; another, 1 in 4; and another, 2—all he had.

"Enumerating the remedies used in the treatment of the cases reported, we find that the list includes Morphine, Gelsemium, Veratrum Vir., Chloroform, Antispasmodic Tincture, Chloral, Physostigma, Lobelia, Bromide of Potassium, Ergot and Bleeding.

"Taking each remedy in order, we find that Sul. of Morphia was used in ten cases recovering, and in five of the fatal cases. Four of the cases recovering were given Morphia alone, in one it was combined with Chloral, and with bleeding in one. Morphia was not used alone in any of the fatal cases.

"Gelsemium was used in nine cases recovering, and in three fatal cases. In four of the cases recovering it was combined with Antispasmodic Tincture; in two cases it was used with Chloral; in the other three cases it was associated with two or more other remedies.

"We find Veratrum used in seven cases recovering, and in four cases that died. In one of the cases recovering it was used with Chloroform only, but never alone. In the fatal cases it was not used alone.

"Chloroform was associated with other remedies in ten cases recovering, and in five of the fatal cases.

"Antispasmodic Tincture was used in conjunction with Gelsemium in four cases recovering, and in one fatal case.

"Chloral Hydrate was used alone in three cases, and associated with Bromide of Potassium in two that recovered and in five that died.

"Physostigma was used alone in one case that recovered.

"Lobelia was used alone in one fatal case.

“Bromide of Potassium was given with Chloral in two cases recovering, and with Ergot in one fatal case.

“Bleeding was done in three cases, two of which proved fatal. (The first of the fatal cases was bled before the physician reporting saw it; the other was bled through the advice of an allopath who was called in consultation.) The physician reporting the case that recovered did not attribute any curative properties to the bleeding, but wholly to the Sul. of Morphia.

“From the above it will be seen that Sul. of Morphia and Chloral were used alone in more cases recovering than any other remedies.

“Physostigma was not used often enough to prove its value.

“Gelsemium, Veratrum and Chloroform follow closely after Morphine and Chloral. Antispasmodic Tincture and Bromide of Potassium, in many cases, may be the remedy.”

CHAPTER XLII.

TURNING, OR VERSION—CEPHALIC VERSION—PODALIC VERSION—
THE FILLET—THE VECTIS, LEVER, OR TRACTOR—
BLUNT HOOK—PLACENTAL FORCEPS.

ALL operations during labor, for the purpose of artificial delivery, whether manual or instrumental, are necessarily accompanied with more or less danger, and hence, they should never be attempted, for any purpose whatever, unless nature is found incompetent to terminate the delivery, or, when absolutely required to preserve the mother's life, or that of the child, when the mother's life is in a hopeless situation.

The great sacrifice of health and life, among females, from indiscriminate and unjustifiable interference, has led some practitioners to set aside all artificial means of relief, and to rely entirely on unassisted nature, in every case of labor. This, however, is passing into another extreme, and is decidedly wrong; aid is sometimes demanded, and then it must be given—to withhold it would be criminal; and it is among these cases in which the properly educated accoucheur distinguishes himself from the ignorant pretender, by his calmness and prudence, his proper selection of the time for affording assistance, as well as of the means to be used, and the cautious and skillful employment of these means.

U O P

Let the student remember, that in no case are the efforts of nature to be intermeddled with, either by manual or instrumental operations, unless it be known that the welfare of the mother, and possibly the life of the child, demands it; the woman should not be allowed to suffer extreme exhaustion, for the want of instrumental interference, notwithstanding the fact that the natural efforts may be sufficient to complete the labor. Prolapsus of the uterus, rupture of the uterus, inversion of the uterus, profuse hemorrhage, peritonitis, permanent dysmenorrhea, laceration of the vagina, and also of the perineum, etc., have frequently resulted from ill-timed, injudicious, and unwarrantable endeavors at forwarding the delivery. These accidents have occurred in the practice of the most eminent obstetricians in instances where the greatest care and prudence were exhibited; how much more readily then will they happen in the practice of the ignorant, officious, and unscrupulous practitioner? Were females, or their husbands and friends, generally aware of the great want of skill and knowledge in this department of medicine, which prevails so extensively in the profession, and which is based upon the fact, that in the majority of labors the unassisted and natural resources of the system are adequate to the task of completing labor, they would be more careful and scrupulous in their selection of obstetric attendants, and by this means would compel students to be more attentive to the means of becoming efficient and skillful. I do not refer merely to a want of knowledge and practice in labors actually requiring assistance, but, more particularly to those in which no aid is needed, and in which the practitioner destroys either health or life, by vain and ignorant displays of unwarrantable manipulations.

Among the operations occasionally required during labor, and to which some reference has been made in the preceding pages, that of **TURNING** or **VERSION**, may be noticed. According to Churchill, 49,323 cases in English practice, required turning in 190 instances, or about 1 in 260; 37,479 cases in French practice, required it in 400 instances, or about 1 in 93½; 21,516 cases in German practice, required it in 337 instances, or about 1 in 64. Making 927 cases of version out of 108,318, or about 1 in 117. In 192 cases, in which the mortality to the mother has been named, 12 died, or 1 in 16. In 565 cases, 187 children were lost, or nearly 1 in 3. Some allowance must be made, however, for the various and serious accidents which render the operation necessary.

There are two modes of turning mentioned by writers; one, the **CEPHALIC VERSION**, or *Version by the Head*, in which the head

is brought to the pelvic brim; the other, **PODALIC VERSION**, or *Turning by the Feet*, in which delivery by the feet is substituted for that by the original presenting part.

CEPHALIC VERSION, has been recommended at various times by eminent accoucheurs, but, heretofore, it has not proved so efficacious as could be desired, although less dangerous to the child than podalic version, and hence is not much practiced. It has been advised in malpositions of the vertex, in face and ear presentations, and sometimes in shoulder presentations; but where prompt delivery is demanded, turning by the feet is preferred, because cephalic version as ordinarily performed, renders the delivery more tedious. In reply to objections, that it is difficult to seize the head firmly, and bring it to the brim, Velpeau observes: "1st, it is not always very difficult to seize the head, and to exert considerable force upon it; 2dly, if the waters have not long been discharged, one may often without difficulty seize the vertex, and bring it to the center of the brim, however far it may have been distant; 3dly, that in general it is better to force the head to descend, by pushing up the presenting part, than by bringing down the head; 4thly, that delivering by the breech is far from being a simple and safe operation; as regards the child, it is less so than cephalic version, even if the forceps should be afterward applied." Notwithstanding this reply, there is much weight in the objections; and attempts to push up the presenting part will frequently induce such violent uterine contractions as to cause the operator to desist.

In cases where ordinary cephalic version is preferred, the bladder and bowels should be emptied, the female placed upon her back, the vagina and soft parts, as well as the hands of the accoucheur, well greased, and, to relax the abdominal walls, the legs should be flexed, with the thighs well up toward the abdomen. Any uterine obliquity should be remedied. The hand is to be introduced into the vagina and uterus in the same manner as named for podalic version. Maintaining the uterine fundus steadily with the external hand, the fetus may be manipulated carefully with the other hand, until the head is brought into proper position; this can often be effected without passing the whole hand into the uterus. If the membranes are not ruptured by the operation, they should be as soon as it is terminated. In many cases external manipulation will greatly aid the operation, as, where the abdominal and uterine walls are thin. If the uterus does not promptly contract after the version is accomplished, the forceps will be required. The operation is readily performed in some instances, but is very difficult, if not quite impossible, in others where it is indicated, and would seem easy of execution.

PODALIC VERSION, or *turning by the feet*, is the operation generally practiced and preferred in those cases where a change of position, or prompt delivery is required. It possesses several advantages as well as disadvantages. The *advantages* are, that the accoucheur has the labor more completely under his control, and can deliver or not, as the case may require, with or without uterine action; it is nearly equal, in point of safety, to vertex labors, and is considered superior to any other; it is frequently the only method by which to save the child's life, or to avoid exvisceration; and often it is the only chance for the safety of the mother. Its *disadvantages* are, that the risk to the mother's life is always enhanced by an introduction of the hand into the uterus; that it is sometimes very difficult, if not impossible to effect it, and that the fatality to the child is very great where it has been performed, about one in three being lost.

The *cases in which turning may be effected* with advantage, are in shoulder presentations; transverse presentations of the body; malpositions of the head; difficult breech labors; placenta prævia; hemorrhages; convulsions; prolapse of the cord; rupture of the uterus; syncope; and whenever the mother's life is jeopardized. It must not be forgotten, however, that turning is never to be attempted when the head or presenting part has passed through the brim into the pelvic cavity; delivery must, in this case, be effected by the forceps or perforator. When the head passes into the vagina, the cervix will contract around the neck of the child, and it will then be impossible to return it into the uterus. But when the head has not completely passed beyond the os uteri and the superior strait into the vagina, it may be pushed upward into the uterus, and version may then be accomplished.

The most important point for the accoucheur to determine, is the *suitable time for the operation*; a precipitate interference, or too long a postponement, are equally fraught with danger. There are, however, instances in which delivery by turning should be promptly effected, and others, again, in which it should be delayed.

Turning, when required, should always be accomplished as soon as possible, in placenta prævia, in preternatural presentations, in profuse hemorrhage, and whenever symptoms arise which threaten the life of the mother or child, *provided*, in each instance, the os uteri be soft, dilatable, and sufficiently dilated.

It should be delayed, when the os uteri is rigid, or soft but not sufficiently dilated, until these conditions, especially the first, have been overcome naturally, or by proper treatment; and, when the mem-

branes have been long ruptured, the liquor amnii having entirely escaped, and the uterus contracting powerfully upon the fetus.

At an early period of labor it is very difficult to detect a mal-presentation, or a mal-position, although it may be suspected by the shape of the protruding bag of waters, as heretofore mentioned; but, when the os uteri has nearly completed its dilatation, and more especially when the membranes have ruptured, any preternatural presentation may be correctly determined. And this period is always the most favorable for the operation of the version. Should, however, a mal-presentation, requiring turning before labor can be terminated, be detected before the membranes have ruptured (as a shoulder presentation, or placenta prævia, etc.), the operator may attempt the version, as soon as the state of the os uteri will permit the introduction of the hand, without the employment of force; in this case, as the hand advances, the membranes become ruptured, the wrist and arm prevent the liquor amnii from escaping, the uterus remains distended, and the turning is readily accomplished. But, although prompt action of this kind is required in placenta prævia, or hemorrhage, a delay, until the os uteri is fully dilated and the membranes ruptured, does not necessarily occasion any greater risk in a presentation of the shoulder.

When the os uteri is rigid, or when, the waters having been long discharged, the uterus contracts powerfully upon the fetus, no attempts at introducing the hand must be made until the rigidity has been overcome, or the irritable condition of the uterus lessened by the means heretofore named.

Turning has been advised as a substitute for the employment of the perforator, in some cases of narrow or deformed pelvis; but, from the difficulty in always being able to correctly ascertain the relative proportions between the fetal head in utero and the pelvic diameters, it seems to me an infeasible plan. The risks to the mother must be greatly augmented by the operation if unsuccessful, while those to the child will be by no means diminished. And yet cases are recorded in which the operation has proved a success. The reason given for this practice in pelvic deformity is, however, certainly one deserving consideration, namely: that the bimastroid diameter or base of the fetal skull being smaller than the bi-parietal diameter by from half an inch to three-quarters of an inch, it may be drawn through the brim of a pelvis, the antero-posterior diameter of which is $2\frac{1}{2}$ to $2\frac{3}{4}$ inches; and that when delivery is effected in this manner, the bi-parietal diameter will admit of compression that will elongate the head and diminish

this latter diameter so that the passage of the head may be effected. While, on the other hand, when the vertex presents at the deformed brim, the contractions of the uterus cause it to bulge out laterally and thus increase the bi-parietal diameter. The operation is not advised where there is diminished transverse diameter of the brim, but only where the antero-posterior diameter is small, or where there is oblique deformity. The advantages of this practice are, that it can be performed at an early period of the labor, and does not subject the mother to injuries from the use of instruments; the disadvantages are, as stated above, and likewise, should it prove unsuccessful, the woman would have to undergo a still further shock from the employment of the perforator. It is better never to attempt this operation until one or more experienced consulting accoucheurs have examined the deformity and the diameters of the fetal head, and pronounced it practicable,—whenever such consultation can be had in time.

It may be useful here to mention some points made out by Prof. J. Matthews Duncan, M.D., of Edinburgh, concerning the tensile strength of the fully developed fetus, being the result of experiments instituted with the view of determining this matter; according to his statements, the spinal column snaps under a weight of about 105 pounds, while the neck, which is the first to give way, requires a force of 120 pounds. So far as mere strength of materials is concerned, traction upon one leg only is sufficient to dissever the neck. As in the neck, so in the legs, the bones give way before the soft parts. In a contracted brim, the body being delivered, the accoucheur should never exert a traction-force over 120 pounds in his efforts to draw the head through the brim, if he does, the neck will give way. Although a much greater extractive force can be used when the forceps are applied,—in podalic version it should never exceed 120 pounds.

The mode of performing podalic version has already been described; the principle of the operation is about the same in all cases. I will, therefore, at this place, merely recapitulate. Empty the bladder and rectum, the first more especially; place the female on her back, with the hips brought a little over the edge of the bed, her legs flexed back and properly supported. Protect the floor from the discharges. Select that hand for the operation, whose palmar surface corresponds to the anterior surface of the child's body. (If an arm presents, secure it by a ribbon, in order to prevent its rising and interfering with the passage of the head.) The hand and arm must be oiled, and warmed in water [there is no necessity for oiling the palmar surface of the hand] and the former carefully intro-

duced, in a conical form, within the vagina, *during a pain*; it must be passed into the uterine cavity *during the absence of pain*, while, at the same time, the external hand must be placed on the abdomen, over the fundus, to support the uterus; seize the child by the knee (hooking the finger in its flexure), or by the feet, being careful that a foot and not a hand be grasped, and turn the child during the *absence of pain*, bringing the inferior extremities downward and over its front. If the limbs be brought over the back of the child, the spine may, probably, be dislocated. The traction must be gentle and continuous, and not by jerks or forcible measures. Be careful to so manage the operation, that at the last stage of the delivery, the face of the child will be in the hollow of the sacrum. When the version is finished, replace the female in the bed, and leave the delivery to nature; or, should it be necessary to effect this artificially, wait for the uterine contractions and act in concert with them; for if the tractions be continued, and the delivery completed without uterine action having taken place, the sudden evacuation of the organ would be apt to give rise to inertia, hemorrhage, or other difficulties. While the hand is within the uterine cavity, should a pain come on, do not present the knuckles for the organ to contract upon and run the risk of rupture, but grasp the body of the child with the open hand, removing it from the child's body, only when the pain has ceased. When the uterus acts powerfully and vigorously, it interferes with the introduction of the hand, as well as the detection of the feet, and the version; and the operation becomes not only a difficult one, but painful to both the physician and patient. The operation is, however, comparatively an easy one, when the uterus does not act with much force.—The best period for performing the version, is when the os uteri is fully dilated, or nearly so, is soft and the membranes are entire; if they have ruptured, the os being soft and dilatable, the version should be promptly accomplished. Frequently, however, there will be no choice, and we may be obliged to operate under very disadvantageous circumstances. Sometimes, it will only be necessary to pass two or three fingers within the cavity of the uterus, as one or both feet may be within easy reach. Dr. Barnes, the eminent English gynecologist, has given the following rules: "In all dorso-anterior positions (the back of the child looking to the abdomen of the mother), lay the patient on her left side; pass your left hand into the uterus—it will pass most easily along the curve of the sacrum and the child's abdomen; your right hand is passed between the mother's thigh, to support the uterus externally. In the case of abdomino-anterior positions (the abdomen of the child look-

ing to the maternal abdomen), lay the patient on her back, and you may introduce your right hand, using the left hand to support the uterus externally."

The hazards to which the mother is exposed in the accomplishment of version, are, 1st, A rupture of the vagina, through which the fingers or hand of the operator may pass, and which may be occasioned by the employment of too much force, omitting to support the fundus externally, or, a neglect in passing the hand in the direction of the pelvic axes. 2d, If the search for the feet be conducted rudely or forcibly, the hand may be driven through the uterine walls. 3d, The hand of the operator, or the limbs of the child may so bruise or injure the uterus as to occasion subsequent inflammation; but this may arise independent of such injury. 4th, The shock to the nervous system is usually more serious than in natural labors of the vertex or breech.

The child may be destroyed by compression of the cord; or its hip, or spine may be dislocated by forcible traction, or perhaps a limb may be actually torn from it. It must be recollected, that the cord commences being compressed at the period when the nates emerge from the vulva; hence, the greater the delay in the delivery after this time, the more dangerous is it for the child—artificial respiration may be attempted, even while the head is in the vagina.

Some writers recommend us to seize the hips and bring them to the pelvic brim, but this is difficult and seldom attempted; others advise, instead of searching for the feet to bring down the knees when these are readily obtained; for the purpose of turning, I can see no objection to this plan.* As stated on a preceding page, it is recommended to turn by one foot, or knee, instead of two, more especially on account of the increased dilatation of the soft parts, which must follow, and thus afford greater facility for the expulsion of the head. Generally,

* Dr. Guénoit believes it to be useless to seize both feet in podalic version,—one alone will suffice. But we may fail to get the foot, and we may then introduce a finger into the rectum. The finger is hooked in a manner upon the point of the sacrum, which serves as a point of support fully sufficient for giving the proper movements to the child. It may readily be conceived how much more easy this process is than the search for the foot, as it requires only a finger instead of the whole hand. With the hand, the foot slips, and is held with difficulty;—the finger in the rectum has a solid hold, and permits the operation to be rapidly finished.—For a dead child, this process should be resorted to at once; for a living one Dr. G. would hesitate to employ it lest there should result a temporary relaxation of the sphincter, a paralysis of the anus, and an incontinence of the stools for some time. But if very great difficulties are presented to version by the feet, he would overlook these considerations and act at once according to the process.—*Jour. de Méd. et de Chir. Prat.*

this will be found to answer. According to actual measurements, the circumference of the presenting portion of the head, in labor, is from 12 to 13½ inches; that of the breech, with both thighs flexed upon the abdomen, is from 12 to 13½ inches; that of the breech, with only one thigh flexed, the other being brought down, is from 11 to 12½ inches; and that of the hips, both legs being brought down, is from 10 to 11½ inches. So that it is much safer for the child, to accomplish version by one foot or knee only. I was called, some time since, to a case where a foot and arm protruded beyond the vulva, and no justifiable degree of traction could move the child, neither was it possible to return the arm. The waters had been discharged at an early period of the labor, the uterus acted energetically, and the accoucheur had not been able to find the other foot. Finally, after some attempts at changing the position of the fetus in utero had been made, he was enabled to pass his hand upward, when he found the leg across and at right angles with the presenting one; he carefully brought it down, and the child was delivered in a few minutes. In this case it would have been impossible to have effected the version by the one foot.

After the delivery, do not place the child too soon to the breast, but allow the mother a rest for some hours; pursue the means heretofore named, and be prompt to combat the first manifestations of inflammatory action

It may be proper to observe here, that when turning is attempted in vertex presentations, the same rules as laid down heretofore, are applicable; but the head will require to be elevated some or moved, so that it will be placed in one or other iliac fossa.

The FILLET, is a strong piece of linen or ribbon, about three inches in width, and twenty-five or thirty inches in length, and has been recommended in breech labors, when the pains are not sufficient to complete the delivery. Its mode of application is to oil or grease it, and then, having rolled up some five or six inches of one end, pass it into the vagina, and by means of the fingers push it between the child's thigh and abdomen from one side to the other; then bring down the rolled-up end, as it passes from the side opposite to that at which it was first carried, and tie the two ends together. By this means, the fillet is secured across the thighs, so that traction may be made upon them, and which must always be done during a pain, acting in concert with uterine action, or the bearing-down efforts of the patient. It is very difficult to adjust the fillet, and, probably its use may be dispensed with altogether. A finger, or the blunt hook, passed

between the hips and abdomen, may, with a prudent force, perform all that can be expected from the ribbon. It is used, also, to secure the presenting hand in a shoulder presentation, when turning is attempted, and thus prevent it from rising and embarrassing the delivery of the head. It should be applied to the wrist.

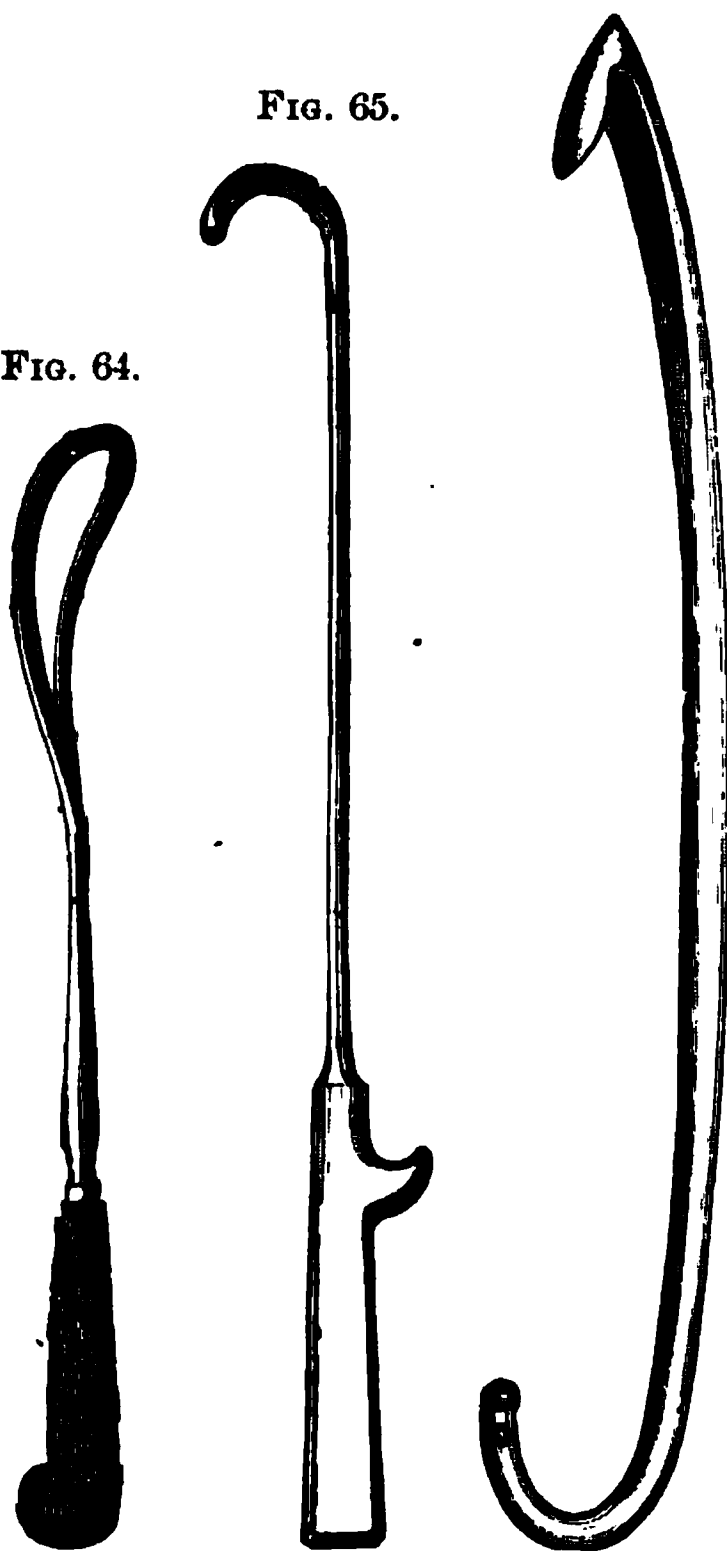
Whalebone and steel fillets have also been invented for passing over the head to aid in its delivery when this is required, as substitutes for

FIG. 66.

the vectis and forceps in certain cases. The best are stated to be Dr. Westmacitt's and Dr. Sheraton's; I have never had occasion for them, considering them to be unscientific, and vastly inferior to the forceps.

FIG. 65.

FIG. 64.



VECTIS. BLUNT HOOK. BLUNT HOOK AND CROTCHET.

The VECTIS, LEVER, or TRACTOR, is an instrument somewhat resembling one blade of the obstetric forceps. It consists of a steel blade fitted into a roughened handle of hard wood, the whole instrument being twelve or thirteen inches in length. The extremity of the blade is expanded like a forceps blade, is furnished with a fenestra, and one side is so curved as to adapt it to the convexity of the head of the child. Sometimes it is made with a hinge, for the purpose of carrying in the pocket, and again it is made without a hinge, but having the handle to screw on the blade; both of these latter forms are objectionable. It is not necessary to enter

into a minute description of the instrument, from the fact that very few obstetricians of the present day make use of it; in former times, however, it was much in vogue. (*Fig. 64.*)

The vectis has been recommended for the purpose of correcting mal-positions of the head, or of aiding its movements, whether at the brim or in the pelvic cavity; it has also been advised as a tractor to aid in the delivery of the head. The rules for its introduction are

somewhat similar to those for the forceps. The instrument should not be applied unless the os uteri is dilated and yielding, as also the soft parts, and labor-pains must likewise be present, or its employment would be attended with no success. Instead of being secretly used, as has been frequently the case, the patient and her friends should be acquainted with the necessity for interference, the same as in the use of the forceps, and which must never be attempted unless positively demanded. Then having emptied the bladder, and rectum also if necessary, place the female on her left side, or on her back, as the practitioner prefers—though in the latter position it will be necessary to bring the hips over the edge of the bed, the same as when the forceps are employed. The operator will now pass three or four fingers of his left hand as high up as possible within the vagina, over the head of the child, to serve as a director for the vectis—which, having been properly warmed and oiled, is to be carefully and slowly passed over the convexity of the fetal head, until the point is reached to which the force is to be applied. Then withdraw the hand to about the middle of the instrument, forming a fulcrum with it at that point; the lever is then of the first kind—the right hand acting on the handle by pressing it in a direction opposite to the one which it is desired the head should take. Sometimes, it is formed into a lever of the third kind—the right hand serving as the fulcrum or point of support, while the left, at the middle of the lever, gives to it the necessary movements.

It is frequently the case that the vectis will have to be placed on several parts of the head in succession, in order to reduce its malposition and aid in its descent, and this may be accomplished by carrying the instrument gently over the circumference of the head, from point to point, without withdrawing it; and should any difficulty be present interfering with its application, no force must be employed to overcome it—if it can not be passed without rude measures withdraw the vectis, and and reintroduce it. It may also be necessary to use it alternately as a lever, and as a tractor. When used as a tractor, both hands are to be employed in making firm, but not violent traction in the direction of the axes of the pelvis, according to the location of the head, and the efforts should be made only during the presence of a pain, ceasing during an interval, and slightly raising or loosening the instrument from the cranium. The least force sufficient for the purpose is the best. When the head is at the brim, the vectis must be applied over the occiput; when at the inferior strait, it must be introduced over the sides. The necessary changes may be effected by only three or four efforts, sometimes thirty or forty will be required.

At the present day those who advise the vectis, limit its application to cases—where the head can not execute its motion of rotation in the pelvic cavity; in face presentations—applying it early in labor over the occiput, making traction, while at the same time the chin is to be pushed up by the hand, for the purpose of bringing down the vertex; in presentations of the side of the head—and, likewise, in instances where the head does not advance, the pains being strong, and where there is only room sufficient for one blade to act. However, in nearly all these cases, the forceps, or a manual operation, will usually be found sufficient, and, should the vectis be required, one of the forcep blades will be found fully adequate to effect all that can be accomplished by it. I should hesitate a long time before attempting to use this instrument on the head, above the superior strait.

In the hands of the unskillful or imprudent operator, the vectis may occasion serious results; thus, if it be introduced while the os uteri is not dilatable, nor sufficiently dilated, it will give rise to contusions, and laceration of the parts, and death to the mother. If it be rudely or carelessly introduced, the vagina or the uterus may be ruptured. If the traction be not made in the direction of the axes of the pelvis, as the situation of the head may require, not only will the female be seriously injured, but the operation will prove of no avail. If a portion of the uterus be engaged in the cavity of the blade, between it and the fetal head, a fatal injury may be the result. If the traction be made regardless of the pains, not only will the operation prove useless, but the female will be exposed to much danger. If the instrument be pressed upon the soft parts of the mother, they must suffer more or less from contusion. If too much force is applied as the head glides over the perineum, or if this be not supported at the time, a very serious rupture may be the consequence. Too much pressure with the point of the instrument upon the child, may occasion a troublesome wound.

Dr. A. K. Gardner's *tractor* is undoubtedly a most excellent instrument for the purposes for which it was designed, as it does not exert any injurious pressure upon the hard or soft parts of the mother when properly employed. It may be used to flex the head in early departure of the chin from the breast, to aid in rotation in face presentations, and for delivering the head when necessary, after the birth of the body of the child. In some cases it is preferable to the forceps, as but one blade is to be applied (a saving of time), and which has nearly the same power as the forceps. It is applied similar to a forcep's blade.

The BLUNT HOOK (*Fig. 65*) consists of a round rod of metal, curved at one extremity, and having the other fastened into a roughened handle of hard wood. Hodge's forceps (*Fig. 68*) are so arranged that either blade may be employed as a blunt hook; it may likewise be obtained in one rod without any handle, the extremity opposite to the blunt hook being formed into a crotchet. It is used in presentations of the breech, when delay in the labor renders it necessary to make traction, and the finger can not be introduced into the groin, or when the finger can not exert a sufficient degree of traction: it may also be used in those cases where it becomes necessary to pull down the feet, but which it is impossible to effect by the fingers. It is also occasionally employed in those cases where, the head having been delivered, the thorax, from its size, prevents any further advance of the labor; in these instances, it is passed into the axilla of the shoulder nearest the sacrum, to disengage this first. It has also been recommended as a substitute for the crotchet, when the cranial bones are so loose as to render it almost impossible to obtain a purchase upon them by the crotchet: the blunt hook may in these cases be passed behind an orbit, or into the foramen magnum.

This instrument is to be applied in a manner similar to that recommended for one blade of the forceps: it should be passed with its point directed toward the palmar surface of the hand by which it is guided, and when it has reached the point on which we design to have it act, give to it a rotatory motion in the direction of its axis, and thus cause its free extremity to pass into the axilla or fold of the groin, being careful, in the latter instance, not to injure the genital organs of the child. After the blunt hook is applied, always examine and ascertain that it has been properly adjusted, and is in a position to effect no injury to either the mother or child.

When the groin can not be hooked by passing the instrument in front of the anterior hip, this may be effected by introducing it between the thighs. An improper use of the blunt hook may give rise to serious difficulties. It is not very frequently employed at this day.

CHAPTER XLIII.

THE FORCEPS — DAVIS' FORCEPS — HODGE'S FORCEPS — CASES IN WHICH TO BE USED — CASES IN WHICH NOT TO BE USED — PERIOD FOR USING THEM.

FORMERLY, when there was any delay in the advance of the presenting part of the child, from whatever cause, it was the custom to insert a hook into the eye or some other part of the child's head, and then apply extracting force; consequently, but few children were saved, and those who did live subsequently, were more or less disfigured or mutilated. Such an operation must have been repugnant to every feeling and conscientious man, causing him to postpone its performance as long as possible, and which delay would necessarily add to the hazards of the mother.

But the invention of the forceps has relieved the obstetrician in a great measure of these unpleasant operations, while at the same time it has been, and still continues the means of saving the lives of numerous children, as well as mothers. The forceps were invented in the sixteenth century, prior to 1647, by Dr. Peter Chamberlen, who, together with his sons, kept it secret until some time in the early part of the seventeenth century, when it became gradually known to the profession. However, it had been employed by Solinger in Germany, and Palfyn in France, for some time before it became generally known what the instrument was, or who was its inventor. Since its introduction the original instrument has undergone various modifications, some of which are less objectionable than others, or, perhaps, are superior only in certain cases. It is unnecessary to enter into a detailed history of the invention and introduction of the instrument, or to describe the many changes through which it has passed; for such information, there are various works to be readily obtained, which contain all the particulars, and which those who are curious in this matter may consult. The limits of this work will not permit more than a close adherence to the practical and useful.

The obstetrical forceps is composed of two arms or branches, each of which has three distinguishing parts: 1st, the *cochlea*, blade, jaw, or clamp, which is shaped somewhat like the bowl of a spoon, and the concavity of which is intended to be applied on one side of the child's head; 2d, the *junctura*, joint, lock, or hinge, at which point the two

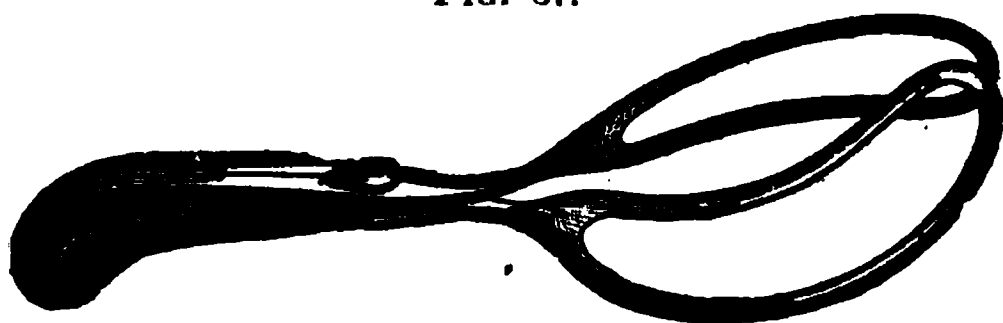
blades articulate with each other ; and 3d, the *manubrium*, or handle—which should be of sufficient length to enable the accoucheur to operate with facility. The blade of each branch has an opening or fenestrum, which lessens its weight materially, beside having the advantage of allowing the parietal protuberance to pass out beyond them, when applied over the sides of the head, and thus lessening the diameter which would be presented, were the blades solid ; each blade is curved in the direction of its longitudinal axis, as well as in that of its transverse, which enables the instrument to be more readily introduced and acted upon in the direction of the pelvic axis. The joint in each blade varies, one being furnished with a pivot and the other with a notch or mortise ; when the two are properly united, the blades are firmly locked. Others are made with the double mortise joint ; the blades firmly locking without a pivot, making it less difficult to adjust them. To distinguish the blades from each other, the one with the pivot is termed the *male blade*, and that with the mortise the *female blade*. The handles of the Hodge forceps are similar in each, having a curvature externally, which not only admits of their being firmly grasped without slipping, but also serves to fulfill all the purposes of a blunt hook. In other varieties the handles are shorter, not curved, and usually mounted with wood.

There are two descriptions of forceps in general use, *the short* and *the long* ; the former were more in vogue some years ago, but since the excellent improvements made in the long forceps by Prof. Hodge, it is more in favor—because, while it possesses all the benefits of the short forceps, it has an advantage in its applicability to operations at the brim, when these are required. The short forceps are only useful when the head is at or near the inferior strait.

Nearly every obstetrician has some favorite model of this instrument ; but among the short forceps, I believe those of Prof. Davis, of London, have been more generally preferred by the profession of this country. Prof. Meigs, who adopted them, gives the following description : “ It weighs ten ounces and three-quarters, and is in length twelve inches ; its lock is the English lock, composed of a notch in the upper surface of the left and in the lower surface of the right-hand branch. When the handles are closed, the ends of the clamps are seven-tenths of an inch apart, while the fenestræ, at their widest part, are two and three quarter inches asunder. The broadest part of the fenestrum is equal to two inches, while its whole length is five inches. From the extremities of the handles to the lock or point where the branches cross, is four and a quarter inches. After the

branches are crossed, they do not divaricate, but proceed in parallel lines one inch and a quarter; hence, if a fetal head be ever so considerably elongated by the pressure of the parts, the clamps are sufficiently capacious to contain it, being seven inches long. In this instrument, such are the width and length of the fenestræ, that a large part of the parietal protuberances jut out through or beyond them when they are fixed on the head." * * * "Its interior face is perfectly adapted to the rotundity of those parts of the head which it touches; while the fenestræ are so vast as to permit considerable portions of the parietal protuberances to project as segments of curves

FIG. 67.



HALE'S SHORT OBSTETRICAL FORCEPS.

outside and beyond the fenestral openings. It would be true to say that the instrument, when accurately adjusted upon the sides of the cranium, scarcely touches the mater-

nal tissues within the pelvis. The exterior curves are also arranged so accurately that the tissues of the mother can never touch the edges of them; so that they can not be cut by them, the surfaces of contact being everywhere broad and gently rounded. The admirable form of the old-curve, or head-curve, enables the instrument to touch very large portions of the cranial surfaces, pressing them equally, and not unequally; so much so, indeed, that, when the instrument is accurately applied, it would be a very difficult matter to do with it the least injury to the fetus, since it can scarcely slide."

The short forceps designed by Prof. Hale answers a very good purpose also, and is preferred by many physicians. (*Fig. 67.*)

But, however useful the above forceps may be, it is a matter of considerable moment to so simplify all our instruments, that one only of them may be adapted to the accomplishment of several purposes; and this is more especially necessary in obstetrics, in which it frequently occurs that delay, even of a short interval, is attended with serious results. On this account Hodge's improved long forceps have been more usually preferred by many than others, not only because of their lightness and correct form and adaptation to the purposes for which they are intended, but likewise because they combine the utility of the short forceps, the long forceps, the vectis, and the blunt hook. This instrument is a modification of the long French forceps, and is described by Prof. Hodge himself, as follows:

“ The great object of the forceps is to extract the head of the fetus from the mother's organs, in suitable cases, without injury to the mother or child. It is notorious that injuries to one or both parties frequently result, exciting a too-well founded dread of this instrument in the minds of females, and even of physicians. Many causes contribute to this unfortunate result. No doubt much depends on the size, weight, and especially on the form of the instrument employed, a fact confirmed by the almost innumerable varieties which have been suggested. The instrument, as heretofore used, is evidently imperfect; and the one now suggested, is presented under the impression that, while it maintains all the excellencies of the former varieties, the injurious influences are partly, if not wholly, avoided. It is a modification of the long French forceps, but may be well termed an eclectic forceps, as combining, as much as possible, the peculiar excellencies of the English, German, and French varieties.

“ The advantages of the French or long forceps are, I think, many and decided, as, 1st, by them, any operation pertaining to this instrument, can be performed. There is no necessity to vary the form, structure, or size, of the instrument, whatever may be the presentation of the head, its position, or its location. 2d. By them, sufficient power can be applied in cases of necessity, which can not be done by the short forceps. Their leverage is greater. 3d. The narrowness of the blades, which, without detracting from the utility of the instrument, will allow of their application to the sides of the head, even in oblique and transverse positions. Many of the modern English forceps are too broad to allow the proper manipulation of the instrument in the cavity of the pelvis. They can not be introduced through the vulva without pain, especially in first labors. The French forceps can very generally be applied without pain.

“ 4th. It may be added as another advantage, that as habit in the use of an instrument is all-important, the practitioner will sooner become accustomed to a forceps which he can employ on all occasions, than when he is obliged to vary it continually; especially when it is remembered that among the strong and well-formed females of America, cases for the forceps are not very numerous in the circle of any practitioner.

“ The disadvantages, which experience has taught me arise from the French forceps are:

“ 1st. Its unnecessary weight.

“ 2d. The pelvic curve, in the variety most in use in this country, is not sufficiently great. Hence, when the head is high in the pelvis,

the perineum will be too much pressed upon, or else the blades will be applied in the direction of the occipito-frontal or longitudinal diameter, instead of the occipito-mental or oblique diameter.

“3d. The divergence of the blades commencing at the joint must necessarily distend the vulva (especially its posterior margin) prematurely, and when the head is high up, gives pain and endangers the laceration of the perineum.

“4th. The small size and kite-like shape of the fenestra prevents any portion of the cranium, even of the parietal protuberances projecting into their openings: hence, the hold on the head is less firm, and space is occupied by the blades, the thickness of which is added to the transverse diameter of the head.

“5th. The flatness of the internal or cephalic surfaces of the blades, so that the margin of the fenestra, often measuring three-eighths of an inch, is much thicker than the external edge of the blade, increases the space occupied by the instrument. Hence, in cases of difficulty, where compression is employed, contusion or even wounding of the scalp results.

“6th. The mode of junction of the French forceps is decidedly inconvenient when compared with the English, and especially with the German mode.

“These disadvantages I have endeavored to obviate without diminishing or circumscribing the utility of this most valuable instrument, to which the profession and the public are so much indebted. My experience encourages the hope, that the attempt has been in a very great degree successful, so that even in inexperienced hands, the dangers of the forceps have been materially lessened.

“1. The weight of the instrument has been diminished from twenty ounces, avoirdupois, to seventeen ounces.

“2. The pelvic curve has been slightly increased, so that the perineum may not be dangerously pressed upon when the blades are in the axis of the superior strait. To counteract any loss of power which may ensue from the increased curvature, there is an angular bend in the handles, in an opposite direction, that the direct line of traction may be preserved, a suggestion of our skillful and experienced instrument maker, Mr. Rorer.

“3. The shanks or commencement of the blades are nearly parallel, diverging no more than is absolutely necessary, until they approximate the head of the child, when a more rapid curvature, than in the Levret forceps, occurs.

"4. The proper blades of the instrument, from the shanks to the extremities are nearly of the same breadth throughout, being equal to that of the extremity of the French forceps.

"5. The advantages are a more secure hold of the head, and especially allowing larger fenestræ, so that the parietal protuberances may project into the openings, and no space occupied by the blades, when properly applied.

"6. The cephalic surface of the blade is concave, so as to be adapted to the convexity of the head, as suggested by Dr. Davis in his improved forceps, hence no edges touch the scalp, and there is no wounding of the tissues, even when great compression is made.

"7. The very ingenious and scientific mode of locking the blades, as in the German or Siebold's forceps, by means of a conical pivot, and the corresponding oblique conical opening for its reception, is adopted, by which all the facilities of the English junction are enjoyed, and the security and firmness of the French joint are maintained.

"The eclectic forceps weighs one pound and one ounce, being nine ounces lighter than the French forceps, as usually manufactured by Rorer, of this city, and eleven ounces lighter than a specimen of Dubois forceps in my possession, made in Paris.

"The whole length of the instrument (*Fig. 68*) in a direct line from *b* to *c* is 16 inches; from the joint *a* to the extremity *b*, the length of the handles, is 6.8; from *a* to *d*, length of parallel shanks, is 3.5; from *d* to *c*, the proper blades in a direct line, is 6 inches; from *c* to the extremities, to *e f*, the greatest breadth, 3.7 inches.

"The separation between the points *c c*, when the handles are in contact, is .5 of an inch; from *e* to *f*, the greatest breadth when the handles touch, is 2.5; when the separation at *e f* is 3.5, the points *c c* are separated to two inches; the breadth of the blade is 1.8, slightly tapering to 1.7 near *c c*, the extremities. The breadth of the fenestra is 1.1; the thickness of the blade is .2 of an inch. The perpendicular elevation of the points *c c*, when the instrument is on a horizontal surface, is 3.4 inches, which indicates the degree of curvature of the blades.

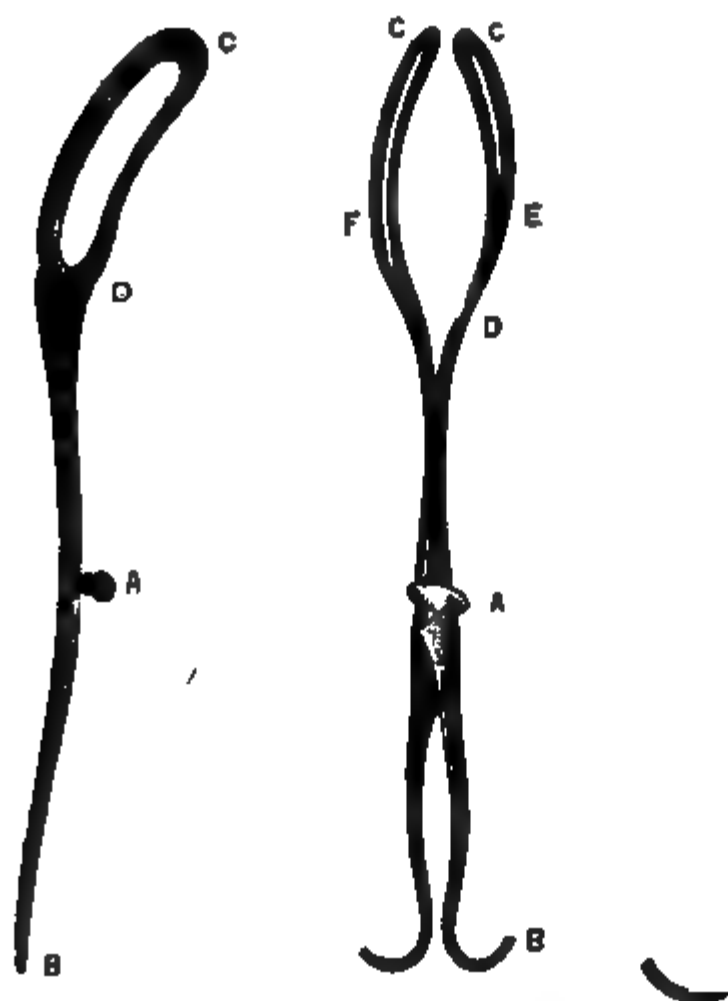
"The elevation of the handles near the point, above the same horizontal line, is 1.3 (including the thickness of the blades), which indicates the extent of the angular bend in the handles."

It is sometimes the case that the head is delayed in its descent in consequence of its bi-parietal being slightly larger than the antero-posterior diameter of the superior or inferior strait; in such instances, the instrument of Professor Hodge may be applied along the sides of

the head, and sufficient compression be made upon this diameter to insure its passage through the brim, and into the pelvic cavity, or through the outlet. Too much compression, however, will destroy the child, and this should always be kept in mind when operating.

From experiments instituted by Baudelocque, upon several still-born children, as to the amount of compression which the fetal head will safely bear, he found that the degree of reduction which the diameters may harmlessly undergo, is very inconsiderable, not exceeding four and a half or five lines; that the extent of the reduction

FIG. 68.



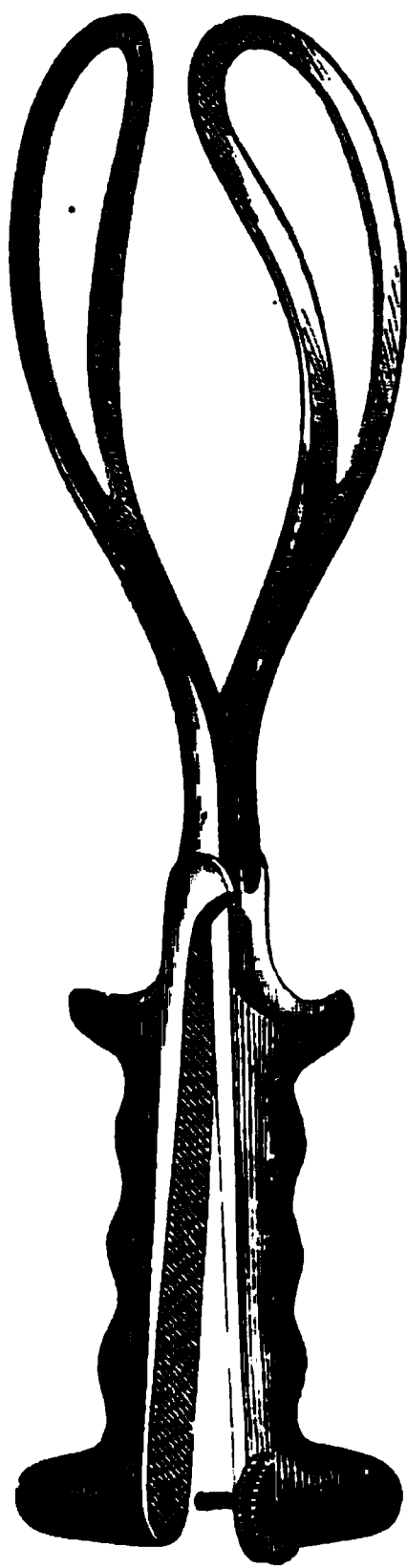
HODGE'S FORCEPS.

depends much upon the more or less perfect ossification of the cranial bones, and the ratio of closure of the sutures and fontanelles, and that it can not be properly estimated from the amount of force employed in approximating the handles, nor from the distance remaining between them when thus approximated in delivering the head.

Professor Meigs most emphatically pronounces the forceps to be the *child's instrument*, and not the *mother's*—that it is by no means to be viewed as a *compressive* instrument, but always as an *extractor*; a declaration which should never be forgotten by the obstetric operator.

However, it may be proper to state that there are many accoucheurs who, though recognizing the correctness of Professor Meigs' remarks

FIG. 69.



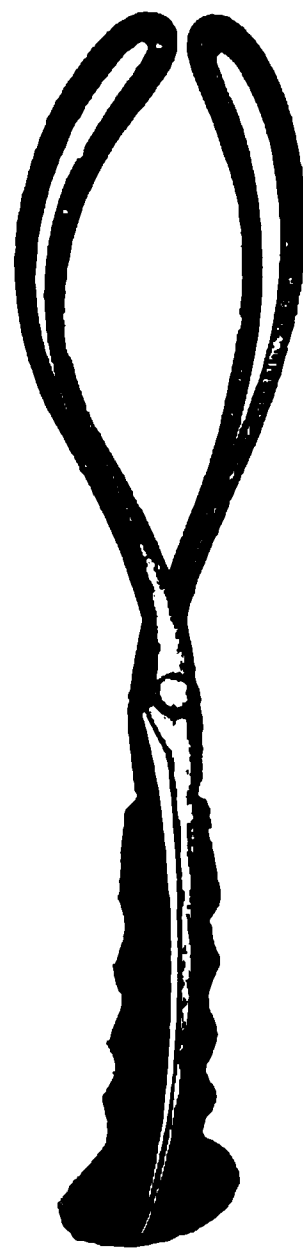
ELLIOT'S FORCEPS.

management will frequently render a resort to the perforator unnecessary.

In addition to the forceps heretofore named, there are many others employed by the profession, each of which, though framed upon the same general principles, appears to have certain advantages in its favor, and which the accoucheur generally selects according to his own views—but it is not necessary to give more than this brief reference to them, especially as the rules herein given for their employment are equally adapted to all or any of them. As with many other things, the forceps have not only undergone real

on this point, as a general principle, yet consider that there may be some exceptions, as in moderately contracted pelves, in which a gradual compression of the head may effect delivery, without evil results to either the child or its mother. Among them I may name Dr. Rigby, who says: "The slow and gradual pressure of the forceps thus exerted (by tying the handles together and tightening them after every successive effort), upon the head of a living fetus, will have a very different result to that of the experiments of Baudelocque and others, in attempting to compress the head of a dead fetus, by the application of a sudden and powerful force." So that, from these remarks, it may be well to consider the use of the forceps as a compressor, above the brim, either when its diameters are slightly diminished, or the bi-parietal of the head somewhat augmented, as a mere *exception* to the general rule *that the forceps are not intended for compression*. And when compression is made, the head being within the pelvic cavity, it should never be in the direction of the occipito-frontal diameter, but always in that of the bi-parietal, as being less likely to injure the child. Judicious

FIG. 70.



REAMY'S FORCEPS

or supposed improvements, but have likewise passed through what may be termed *periods of fashion*, as to short or long, style, design, etc.

An objection made by some practitioners to the Hodge forceps is the inability to grasp the metallic handles in the middle, and make traction, without the hands slipping; to overcome this, some operators either hook the index finger over the lock, or wrap a napkin or towel about them. There are numerous other forceps, however, that differ from the Hodge in the shape and finish of the handles, being mounted with wood, and designed to give a firm

FIG. 72.

FIG. 71.

and permanent hand-hold. Among these may be noticed Elliot's (*Fig. 69*), Reamy's (*Fig. 70*), Sawyer's (*Fig. 71*), as well as one of my own designing (*Fig. 72*).

Elliot's forceps differs from the Hodge, not only in the handles, but is of much greater width between the blades, both through the point of greatest excavation as well as the tips; it is more especially regarded as an instrument of extraction rather than of compression, and was designed for application to the sides of the pelvis rather than the sides of the child's head. Dr. Sawyer's forceps is also of this design. The forceps bearing my name is of much lighter weight

SAWYER'S FORCEPS.

than the Elliot, and can be easier

WINTERMUTE'S
FORCEPS.

locked than those with the pivot joint, and I think will be found a very satisfactory instrument.

In some countries the forceps are employed much more frequently than in others; thus, according to Churchill, in 52,268 cases of labor occurring in British practice, the forceps were applied in 144 cases, or about 1 in 362½. In 44,736 labors in French practice, they were used in 277 cases, or about 1 in 162; and in 261,224 labors in German practice, they were resorted to in 1,702 cases, or about 1 in 153½. The whole amounting to 358,228 cases of labor, in which the instrument was applied 2,123 times, or about 1 in 168½. The results to the mother in British practice, was 1 death in 20½ cases; to the child 1 in 4½. In French and German practice, 1 mother was lost in 13½, and

about 1 child in 5. As the result to the mother has not been named in many instances, nor the peculiarities of each case given, these statistics can be considered as only approximative. In our own country, the statistics have been too meager and limited to enable us to form any idea of the comparative frequency of forcep labors, or their results. It has been recently stated that "the more frequently the forceps are employed, the less is the mortality to the mother and child." I am not prepared to either deny or admit this statement. If, however, the remark be true, I can only account for it from the fact that, in cases where the instrument is required, it is used at a much earlier period than formerly, while the strength of the patient enables her the better to sustain the shock of the operation, and while the soft parts are yet free from any tendency to sloughing therefrom; and, perhaps, likewise to a more perfect knowledge of the circumstances under which they may be efficaciously employed, as well as to a more scientifically correct application of them.

The cases in which a resort to the forceps has been advised, are the following—recollecting, however, that the short forceps are never to be used when the head has not passed the superior strait:

1. To effect delivery in cases where the uterine contractions are weak and inefficient, and can not be aroused by the ordinary means. Thus, the head may be in the superior strait, not impacted, but making no advance, in consequence of the inefficiency of the pains; here the long forceps have been advised, to assist in accomplishing the descent. Or, the head may present at the brim, in a mal-position, which, not being corrected by the pains, as well as being incapable of reduction by the hand, may be rectified by the long forceps, provided the os uteri be in a proper condition.

In the use of the long forceps, I would remark here, that when employed at the superior strait, the blades are to be introduced in the transverse diameter of this strait, so that a blade will be within each ilium; while both the long and short forceps are to be introduced over the sides of the child's head when it has entered the pelvic cavity, a blade being over each ear—and which rules must be borne in mind when the long forceps are employed as a substitute for the short ones.

2. To hasten delivery when dangerous symptoms to the mother are present, whether from too prolonged labor, hemorrhage, convulsions, exhaustion, rupture of the uterus when the head is within reach, or from resistance of the muscles of the perineum.

3. To save the child's life in some face presentations, and in the occipito-posterior positions when the forehead is behind the pubic symphysis. This, however, is not necessary in all instances of the above character, as delivery frequently terminates by the natural efforts, though more slowly, and with a greater amount of suffering than in ordinary cases.

4. To preserve the child in prolapsus of the cord, when the pulsations grow weak.

5. When there is a detention of the head within the pelvic cavity, heretofore referred to when speaking of the compressive action of the instrument.

6. When an extremity descends with the head, and can not be returned, the augmentation of the diameter within the pelvis, may require a greater degree of expulsive force than can be given by the natural powers.

7. In breech labors, when there is a delay in the advance of the head; the body and extremities having been delivered, the child may die, in consequence of compression of the cord, unless it be removed by the forceps. A few minutes, in these instances, generally determine the life or death of the child.

The forceps are *never to be employed* when the os uteri is rigid and undilatable, or relaxed but not sufficiently dilated; when the perineum is unyielding; when the soft parts are inflamed and swollen; when the diameters of the pelvic cavity are diminished by the presence of tumors; in deformities of the pelvis; when the child is dead; and when the fetal head is hydrocephalic, or firmly ossified. Neither is it to be applied to the breech. And unless there exists some urgent reasons for their use, as hemorrhage, large head, small pelvis, convulsions, etc., they are never to be employed except the pains are inefficient. Indeed, the instrument should always be considered the "child's instrument," and a substitute for absent or inefficient expulsive force of the uterus; and, under no circumstances whatever, is it justifiable to employ them to save trouble, or in any other way accommodate the convenience of the practitioner.

When the uterus acts energetically, the pulse not being over one hundred beats in a minute, the countenance natural, the spirits good, the tongue and mouth moist and clean, the abdomen and soft parts free from pain on being pressed or touched, and the head makes the slightest advance, no interference is required, notwithstanding the labor may have continued over twenty-four hours.

If attempts be made to introduce the forceps before the os uteri and soft parts are in a favorable condition, rupture of the uterus, or lacer-

ation of the perineum and vagina may be the consequence, and which, when occurring, always proves more or less hazardous to the mother. Nor is it proper, when the head is in the pelvic cavity, to carry the forceps within the os uteri, until this has so far risen above the parietal protuberance that it can not readily be felt.

When the soft parts are swollen and inflamed, a condition which will seldom occur in the hands of a careful accoucheur, it will be inexpedient to use the forceps, because of the disposition to sloughing of the parts under such circumstances, and, therefore, the perforator will be the safer instrument for the mother. The same course will be pursued in diminished pelvic diameters from tumors, deformities, or other causes. In these cases the child must be sacrificed for the safety of the mother—this is a fundamental principle of obstetrics. Generally, in instances where the perforator will be required, the pressure will destroy the child, before the symptoms become so threatening as to induce a skillful obstetrician to operate.

When the child is known to be dead, which may generally be determined by the stethoscope, the perforator is advised in preference to the forceps; and this is likewise recommended in hydrocephalic or ossified heads, to be used, even before the child's death, if the safety of the mother requires it.

As the instrument is intended for the head only, it could not be applied to the breech with any degree of safety or success, as it would be very apt to tear or mangle the soft parts of the breech and trunk upon which it might be exercised. But it may be frequently used with advantage to extract the head, after the body of the child has been expelled, when any difficulty or delay occurs in its delivery.

In impacted or locked head, the perforator will generally be required, on account of the impossibility of moving the head with the forceps; this condition of the head is usually connected with a small pelvis, or a large, and perhaps ossified head. But in cases where there is a mere arrest of descent, from a close fitting of the circumferences of the head to those of the pelvis, the forceps may be used.

In all cases where the head is considerably larger than the pelvis, the forceps, as well as a resort to turning are improper; and either the perforator or the Cesarean operation will be required. Yet, as our means of accurately determining the size either of the head or of the pelvis, are not always absolute, it is never improper to attempt the delivery by a careful and gentle employment of the forceps. It will frequently happen that when the antero-posterior diameter of the brim has not reached three inches, the forceps may be successfully used.

The PERIOD FOR OPERATING, will depend entirely upon the circumstances attending each individual case. Previous to the rupturing of the membranes, the employment of the forceps will be unnecessary; but after their rupture, in ordinary cases, we are to be guided more by the constitutional symptoms than by a mere lapse of time. There is one exception to the statement just made, and that is when the difficulty is at the superior strait, and the head can not descend through it, in this case, as too great a delay may give rise to serious symptoms, the second stage may be considered to have commenced as soon as the os uteri is fully dilatable. The rule governing our action will depend on the condition of the patient; if the case is progressing naturally, no signs of exhaustion, the pains increasing, with gradual advancement of the head, interference is uncalled for. Exhaustion, or want of advancement of the head, however, calls for action. It was formerly the rule not to interfere until the second stage of labor had continued for twenty-four hours; it frequently occurs, however, that symptoms present themselves before the twenty-four hours have expired which demand interference; and, again, many females will sustain a prolonged and painful labor, with more fortitude, and less prostration of the system, or other unfavorable symptoms, than others. We must, therefore, be governed *principally* by the symptoms, and *partly* by the lapse of time, being careful not to delay too long, or until the parts become dry and inflamed, and the labia and perineum become infiltrated with serum, for then, laceration and sloughing will almost inevitably ensue. If the head remains arrested for four hours, we are justified in operating even though no unfavorable symptoms exist, because by so doing we preserve the integrity of the soft structures.

In the selection of the proper period for operating with the forceps, in connection with what has already been stated, an attention to certain circumstances, will materially assist us. Thus—if the health of the female has been impaired, or if she has previously suffered from a long-continued sickness, the powers of the system will be less likely to sustain her under a lingering labor, or to terminate the delivery, than when she has been in the possession of good health; though we often meet with females laboring under consumption, dropsy, etc., whose labors are as vigorous and natural as those of the most healthy and robust. If the female has previously given birth to children, there is a greater reason to suppose that the present one may also be born without aid, unless there exist a mal-position or abnormality of the head.

Several hours having elapsed since the commencement of the second stage of labor, with symptoms of exhaustion, together with strong and regular pains without advancement of the head, the forceps will very probably be required; we should not be too hasty in their application, however, being governed, in a great measure, by the symptoms present. Yet we must remember that if the head remains stationary, pressing upon the soft parts for four hours, their structure becomes much endangered. But, "if the head advances ever so slowly, the patient's pulse continuing good, the abdomen free from pain on pressure, and no obstruction to the removal of urine," the strength and spirits of the patient being also good, interference, as a general rule, is not required, unless the child be dead. The mortality to the mother and child, in cases where this rule has been applied, is less than among those where the forceps have been resorted to, and, it must also be borne in mind, that the death of the child alone does not justify any interference, unless there be sufficient cause aside from this fact.

The condition of the patient's strength, and her capacity of endurance must also be taken into consideration; and we must be careful not to be misled as to the exhaustion of the female. The uterus may be acting energetically, and the woman be walking about the room, and yet she will complain of being exhausted; the practitioner must be guided by other symptoms than merely such expressions. When exhaustion is present, the pulse will be very quick, over one hundred beats in a minute; below this there is seldom any danger. The pains, also, gradually become weak, with lengthened intervals, and finally cease; and accompanying this condition there will be a greater or less discharge from the vagina, of a faint, unpleasant, but not putrid odor, and of an olive color, and which is, probably, the secretion from the lining uterine membrane, changed in consequence of the long-continued and powerful exertions of the organ; this may be considered one of the first manifestations of exhaustion. The countenance of the patient assumes an anxious appearance, the cheeks become pale, sallow, or spotted, the eyes sunken and dull, and the tongue will be dry and loaded, either with a brown sordes, or, if fever is present, with a white fur. The respiration is also hurried, and other unfavorable symptoms may appear. Vomiting of a dark fluid, having the appearance of coffee-grounds, is most generally present, when exhaustion has advanced; and when a long period has been allowed to elapse, a shivering coldness of the extremities, with cold, clammy perspiration on various parts of the body, and delirium come on, indicative of great

local injury and extreme danger. But we must not wait for these more severe symptoms, before operating—but should promptly act upon the first manifestations of exhaustion, and, in cases of immediate danger, even at a still earlier period.

The condition of the abdomen, and of the soft parts, will also indicate operative interference. Thus, if there is tenderness of the abdomen on pressure, inflammation is to be dreaded; and immediate delivery will be the safest course to pursue, before inflammatory action becomes developed. If the soft parts, instead of being cool, soft, and moist, become dry, hot, swollen, and painful, so that the least touch can scarcely be allowed, it has been advised by some writers to deliver by forceps; but from the tendency to sloughing in such cases, I do not deem it the best practice. Still, an attempt to subdue the tenderness and inflammation by the application of fomentations may be undertaken in such cases; always, however, recollecting, that the danger increases in proportion as the pressure is continued. To wait, however, for the appearance of vomiting of dark fluid, of cold shiverings or sweats, hurried breathing, delirium, or swelling and inflammation of the soft parts, would be extremely injudicious.

In all these protracted cases of labor, great vigilance is required that we do not delay the operation so long as to endanger the life of the mother; and if there is a chance for saving the child's life without any injury to the mother, the delivery may be undertaken even before those symptoms appear which indicate a failure of the powers of the system. There is always a greater possibility of injury from too long a delay, than from interfering a little too soon.

Occasionally, circumstances will exist which demand the use of the forceps for delivery before the rupture of the membranes; in such cases, if the os uteri is in a favorable condition (and positively not without), the membranes may be artificially ruptured and the instrument applied. Such instances are, fortunately, very rare.

The principal dangers to which the mother is exposed when the forceps are used, are laceration of the vagina, or of the perineum, or of both; laceration of the cervix; and contusion of the soft parts. The child may have its head too much compressed; its scalp, or ear, may be bruised or torn; and the pressure may induce paralysis of the facial nerve.

The principle of axis traction is at present exciting considerable discussion, and has been adopted by a number of obstetricians in the use of the forceps. The idea was suggested by Dr. Tarnier, and has for its object traction directly in the axis of the pelvis, by means of

an attachment to the ordinary forceps. I quote the following from Leishman's Midwifery, in reference to this subject: "An attempt has been made, by Professor Tarnier, to modify the forceps so as to pull

FIG. 73.

more directly in the axis of the brim, and at the same time to protect the perineum, and to avoid injurious pressure in the direction of the pubic symphysis. The instrument, in the construction

FIG. 74.

of which great mechanical ingenuity displayed, is significant in shape, from the addition of a superineal curve,"

The instrument Tarnier was too complicated for general use; it, however, has been simplified by recent modification to the extent of rendering it a very desirable instrument in such cases, and has received the endorsement of some of the foremost

SIMPSON-TARNIER FORCEPS.

most writers

REYNOLDS' ATTACHMENT FOR
AXIS TRACTION

on obstetrics. The principle is clearly shown in the Simpson-Tarnier forceps (*Fig. 73*); or possibly it will be better understood by referring to the Reynold's attachment (*Fig. 74*). This may be used with any forceps. After properly adjusting the forceps, the arms, *b*, *c*, should be attached to the fenestræ of the forceps, then connected at *e*, after which traction may be made by applying the proper amount of force to the handle, *d*; the handles of the forceps should, at the same time, be supported by the disengaged hand.

CHAPTER XLIV.

RULES FOR APPLYING THE FORCEPS—MODE OF APPLYING THE
FORCEPS IN THE VARIOUS POSITIONS OF THE HEAD.

BEFORE stating the manner of applying the forceps, I will briefly recapitulate a few of the general principles referred to in the previous chapter, and which should be constantly kept in view by the accoucheur.

1. When the powers of nature are sufficient to effect the delivery, interference is not required, unless circumstances occur which threaten the life of the mother.

2. The forceps, acting as a substitute for the natural efforts, are to be employed as an extractor, and not as a compressor.

3. They are never, under any conditions whatever, to be used, unless the os uteri is sufficiently dilated and dilatable.

4. They may be used when a delay in the delivery would endanger the child's life, but never at the expense of injury to the mother.

5. Under ordinary circumstances, they should not be applied until the symptoms of exhaustion commence; neither delaying too long until the more severe symptoms come on, nor operating too prematurely.

6. They must not be used when the soft parts are inflamed or swollen, on account of the tendency to subsequent sloughing; neither must they be applied to any part of the child except the head.

7. The lateral motion or oscillating movement from handle to handle must not be allowed to take too extensive a range; and remember, that the higher up the forceps are passed within the pelvic cavity, the more limited will be the extent of these motions, and greater attention will be required not to injure the maternal soft parts.

8. Always avoid hurrying the head through the inferior strait, and fail not to give support to the perineum as it becomes extended by the advance of the head.

Previous to the introduction of the forcep-blades, the patient, as well as her friends, should be made acquainted with the character of the operation, and the necessity for it; for it is not to be supposed that any physician would attempt an operation of this kind without the consent of the patient or her relatives. It may, likewise, be a judicious measure, in cases where imperative haste is not required, to show the instruments and explain their method of operating—

remarking that, as the hands can not be applied to the sides of the head to assist in its delivery, these are employed as substitutes: and that, in the hands of a careful operator, they will not be apt to cause injury to child or mother. Whenever it is possible to procure the presence of another accoucheur with whom to consult and share the responsibility, it should be done, and will be found a very judicious measure.

Consent having been obtained, the bladder must, in every instance, be evacuated, either naturally or by catheter; and if the rectum has not been recently emptied, or if there be an accumulation of the feces, an injection should be administered. But should the injection fail to clear out the rectum, and the symptoms demanding delivery are urgent, the practitioner may proceed to the application of the forceps, having, however, been careful to empty the bladder.

The practitioner, having turned up his coat sleeve and shirt wristband, and also protected his dress from being soiled, by an apron or something to serve a similar purpose, will have the female brought to the edge of the bed, lying upon her back, as in the position for turning, her feet resting on two chairs, or flexed back to the edge of the bed, and separated sufficiently from each other to permit him to sit or stand between them, and her limbs are to be supported by two assistants (not necessarily professional friends), who are to sit with their backs toward each other. The patient's hips should be brought so far beyond the edge of the bed, that no obstacle will be offered to the introduction of the forceps, or to the free use of them after having been applied.

In order to prevent the floor from being soiled by the discharges, some cloths should be placed upon it immediately under the hips of the woman, and that part of the bed on which the inferior portion of her body rests, should also have several folds of blankets or other suitable articles placed there, to protect the bed from the discharges. The female should never, under any circumstances, be exposed: a sheet or blanket, according to the condition of the weather, should be thrown over her. And in order to facilitate the introduction of the blades, lard or some other unctuous substance should be freely applied to the soft parts. An anesthetic should now be administered, either by the obstetrician in charge or by the assistant, providing consultation has been called.

These preliminary measures having been attended to, and the operator *knowing the exact position of the head*, he may sit or stand, as preferred, and proceed to introduce the blades. These, having been

previously warmed to a temperature equal to that of the patient, by placing them in warm water, are to be well greased, and each blade is to be held in its appropriate hand, somewhat similar to the manner of holding a pen, although rather more firmly—or it may be held in the manner of a bistoury while making an incision. Generally, the male blade, or the one introduced by the left hand, is applied first, then the other; and the introduction should invariably be effected during the absence of labor-pains, ceasing all efforts when these return.

Some writers advise that blade to be introduced first which is applied along the posterior part of the cavity, and this will probably hold good in a number of cases; but, as a general rule, it will be found better, in practice, to introduce that blade first which is the least easily applied, always being careful to so apply them that they will readily lock.

Having carefully passed in two or three fingers of the hand not occupied in holding the blade, and insinuated them between the os uteri and the fetal head, both as a guide for the application of the blade, and to prevent the os uteri from being included in the grasp of the forceps, each blade is to be successively and carefully passed over the sides of the head. If the head is high up, it will then be necessary to introduce the whole hand within the vagina, for the purpose of properly guiding the blades; and the direction of the axes of the pelvis, as well as the exact position of the head, and its relations to the surrounding parts, should not for a moment be lost sight of. Each blade must be passed inward with a waving motion, but without any force, and must also be kept in constant contact with the head during the introduction. Should either blade meet with any obstacle to its advance, it must not be forcibly thrust forward, but should be passed beyond the difficulty by careful and adroit management, withdrawing the blade, if necessary, for a reintroduction; should any force be employed to overcome the resistance, the ear, or a fold of the skin, or the soft parts of the mother, would, probably, be torn, and which would reflect much discredit on the skill and attainments of the operator.

As a general rule, the forceps are to be applied with their concave surface grasping the sides of the head in the direction of the occipito-mental diameter; and they are always to be so applied, that at the termination of the delivery, when the head is emerging from under the pubic arch, *their concave edges will be brought under and facing this arch*. By considering for a moment, whether the occiput or forehead

is to be brought under the pubic arch, the practitioner can not fail to properly apply the instrument, for the concave edges of the blades must always be directed to that part of the head which passes under this arch, as it emerges from the outlet.

After the first blade has been applied, it may be held by an assistant until the second one has also been applied, which latter should be introduced above, and as nearly as possible opposite, the handle of the male blade, in order that they may lock readily. If they do not lock easily, and without force, no rude or violent attempts at twisting or wrenching them round should be made, but the female blade should be removed and reintroduced, and it were better to repeat this several times than to attempt an adjustment by force. Occasionally, it may become necessary to withdraw both blades, and reapply them. When properly locked, a finger should be passed around the lock to ascertain that no portion of the soft parts, or of the genital hair, are fastened within it.

Having effected the locking, and removed any hairs, etc., which may be found entangled within the lock, screw down the pivot, by giving it two or three turns, grasp the handles firmly and make slight compression and traction, to ascertain that the instrument is firmly applied, and that no part of the vulva, vagina, or os uteri is included; and which latter circumstances may be known by the violent pain produced—when a withdrawal and readjustment of the instrument will be necessary.

The forceps being properly applied, the operator may now proceed to deliver. Seizing the handles with the right hand, he will hold them together with a sufficient degree of firmness to prevent their slipping from the head, and without exerting an undue compression upon it. The left hand must be applied over the lock of the forceps, with the index finger extended so as to touch the vertex of the child, and thus enable him to ascertain whether the head advances or not with the motion of the instrument. If it does not advance, the finger will be found to leave the vertex as the operation proceeds.

If the handles are held in the left hand, the right should be applied, as above, to the lock; and the middle finger of the hand, at the lock, may be placed in front of it, that is on the part facing the child's head, to aid in the extraction, should more extractive force be required. The index finger must not be removed from the head until it emerges from the vulva; and should it leave the head, the operator must cease action, lest the blades suddenly slip off, and, perhaps, occasion a serious injury to the parts.

The traction should always be made in the direction of the axis of that part of the pelvis, at which the head is successively placed, and must be made only during a pain, ceasing in its absence; or, should the pains have become entirely suspended, the operation should be continued only for two or three minutes at a time, allowing intervals between each effort, and thus imitating, as closely as possible, the course pursued by nature. During the intervals relax the handles, and relieve the head from pressure.

In accomplishing traction, the impulse of the force employed, although guided in the direction of the pelvic axis, successively, is effected by a lateral motion, from handle to handle, keeping the instrument at first, as far back to the perineum as possible, in order to act in the direction of the axis of the pelvic brim (if this be necessary), and elevating the handles as extension ensues and the head emerges from under the pubic arch. About two-thirds lateral force, and one-third extractive force should be given; and the nearer the head is situated toward the brim, the more limited will be the extent of the motion from side to side, while at the outlet a large sweep may be taken.

Most usually the rotation of the head occurs with its descent, carrying the forceps along with it as it rotates, without any effort of the practitioner. But should this motion of rotation not be effected naturally, it must be accomplished by the operator, not by violent exertions, nor by twisting the head, but by continuing the tractions from handle to handle, at the same time slowly and gradually giving to them the proper direction in which the head must rotate.

This lateral extractive motion causes the instrument to act as a double lever, and in effecting the change in the motion from side to side, the operator must be very careful to retain every fraction of an inch which the head advances, not allowing the advance made by one lateral extractive movement to recede when he carries the handles in an opposite direction. Should the contractions of the uterus come on powerfully, and the head commence advancing naturally, after a few motions of the instrument, the rest of the labor may be left to nature; but the forceps must not be removed until the head is delivered, because, if, from an erroneous view of the natural efforts, the removal of the blades has been premature, requiring a subsequent reapplication, it places the operator in a very discreditable and mortifying position.

As the head passes over the perineum, this must be carefully supported by an assistant, and the operator should slowly and care-

fully deliver the head, requiring the patient to lie still, lest any sudden movement on her part, might cause a severe laceration of the perineum. Generally, when the head reaches the outlet, it will occasion tenesmus and sufficient contraction to terminate the delivery, without any further efforts at traction, and all required of the operator will be to gradually carry up the handles of the instrument in front of the pubis, and thus favor the movement of extension; improper traction at this time will almost always cause a rupture of the perineum. But should there be any difficulty in the advance and extension of the head, a moderate degree of traction will then become necessary. Remove the forceps after the birth of the head, and attend to the remainder of the delivery, the same as in a natural labor.

Having now given the general rules for the employment of the forceps, it will be proper to refer to its special applications, in each position of the head or face; commencing with those instances in which the vertex has reached the inferior strait.

LEFT OCCIPITO-ANTERIOR POSITION.

This position (as well as all others) should be positively, and correctly ascertained by a vaginal examination; and if the practitioner is not satisfied with the signs detected by the finger alone, he should not hesitate to introduce three or four fingers, or even the whole hand, extending the fingers over the head, and ascertaining its true position by feeling its various points.

Having the patient properly situated, he will take the male or left-hand blade of the forceps in his left hand, and using two or three fingers of his right hand as a guide, he will carefully introduce it along the left side of the child's head and in front of the maternal left sacro-iliac symphysis, carrying it upward until the extremity of the blade reaches the chin of the child. When the blade is about to be introduced at the vulva, in the direction of the axis of the inferior strait, the handle will lie in an oblique manner over the right groin of the patient, and as the blade passes within the vagina, being guided in the direction of the pelvic axis, the handle will be gradually depressed between the woman's thighs, approaching nearer and nearer toward the median line. When properly applied, the handle will be directed toward the left thigh of the mother, the pivot will look upward and to the left, and the concave edge of the blade will be directed toward the left acetabulum. Having an assistant to hold this blade, the operator will take the female or right-hand blade in his right hand, and with the fingers of his left hand as a guide, he

will introduce it, above the male branch and nearly opposite to it, in front of the right foramen ovale, gradually conducting it along the side of the head in the occipito-mental direction. When this blade is about to be introduced, the handle will lie obliquely in front of the left groin, and as the blade passes within the vagina, the handle will be gradually depressed between the thighs of the patient, approaching by degrees toward the median line. As soon as this blade has entered to a sufficient distance, and been properly adjusted on the right side of the head—both blades being as nearly as possible in the direction of the occipito-mental diameter of the child's head—they will lock without any difficulty. When locked, both handles will lie toward the left thigh of the patient, that of the male blade being uppermost, and the pivot will be directed upward and to the left.

The head being at the inferior strait, as soon as a pain comes on, commence the traction in the direction of the axis of this strait; as the head advances it rotates, the concave edges of the forcep-blades are brought under the pubic arch, and as the movement of extension takes place, the handles must be gradually carried upward in front of the pubic symphysis and abdomen. Accomplishing the remainder of the delivery in the usual way.

RIGHT OCCIPITO-ANTERIOR POSITION.

In this position the male blade, which, in all cases, is to be held in the left hand, must be introduced, along the fingers of the right hand, within the left side of the vagina, and by means of a spiral movement, it should be gradually drawn forward so as to apply its concave surface to the left side of the child's head. The handle will at first be inclined obliquely over the mother's right groin, but as the blade advances it will gradually be depressed, and when properly adjusted, the concave edge of the blade will look toward the pubic arch, and the pivot will be directed upward and toward the right thigh. Depressing the handle, so as to admit the introduction of the opposite blade, place it in charge of an assistant, and proceed to apply the other blade. Taking it in the right hand, and with the fingers of the left hand as a guide, introduce it, above the male branch, along the right side of the head. The handle of this blade will lie, at first, obliquely in front of the left groin, but is depressed as the blade is entered upward. When the blades are properly adjusted, in the occipito-mental direction, there will be no difficulty in locking, and the traction will be made as in the preceding instance.

OCCIPITO-PUBIC POSITION.

This position may include occipito-anterior positions, in which the movement of rotation has been accomplished, and the occiput brought to the pubic arch.

In this position, the male blade will be taken in the left hand, and, with the fingers of the right hand as a guide, must be introduced within the left side of the vagina, along the left side of the child's head, and along the left sacro-iliac symphysis. (*Fig. 75.*) When the blade is about to be introduced at the vulva, in the direction of the axis of the inferior strait,

FIG. 75



the handle will lie in an oblique manner over the right groin of the patient, and as the blade passes within, being directed in a line with the pelvic axis, the handle is gradually depressed, approaching nearer and nearer toward the median line. When properly adjusted, the handle will rest against the perineum, the pivot will be directed upward, and the concave edge of the blade will be under the pubic arch. Placing this in the care of an assistant, the female blade being held in



the right hand, and guided by the fingers of the left, must be cautiously introduced, above the male blade (*Fig. 77*), as far within the pelvis, over the right side of the child's head, as may be sufficient. The handle, which, at first, was obliquely over the left groin, is gradually depressed as the blade advances, and if a proper application has been made, the two branches will lock very readily, the concave edge of each, as well as the pivot being directed upward, and the head being grasped by the blades in the occipito-mental direction. (*Figs. 78, 79.*) The traction must be made in the direction of the inferior pelvic axis,

that is, forward and downward, and as soon as the occiput is placed under the pubic arch, and extension takes place, the handles of the instrument will gradually rise upward and toward the abdomen of the female.

A reference to *Fig. 76* indicates the grasp of the forceps in an occipito-anterior position after rotation. It is not always possible to reach the occipito-mental diameter, and when forced flexion is wanting the forceps will usually adjust themselves as shown in the above cut.

LEFT OCCIPITO POSTERIOR POSITION.

In this position the male blade will be introduced within the left lateral part of the vagina, along the right side of the child's head, gradually advancing it to a proper adjustment as it enters. At the commencement, the handle will lie obliquely over the right groin, but as it enters it is depressed until the blade assumes the direction of the occipito-mental diameter. At first, this direction can not be exactly obtained, and the soft parts at the outlet will be pressed upon considerably; the pivot of the branch will look upward and to the right, and the concave edges of the blades will look toward the child's forehead. An assistant holding this, the operator will introduce the female blade within the right side of the vagina, and along the left side of the child's head, and when properly applied the two branches will lock readily, with the pivot directed to the right and upward, and

the handles will be depressed as far backward as the parts will allow. In both this and the succeeding position, as the blades ~~can~~ not be placed exactly along the occipito-mental diameter at first, they must be gradually brought into this direction as extraction proceeds, being careful not to bruise or injure the soft parts of the mother, or the child's head. In all the occipito-posterior positions, after rotation has been effected, and the *forehead* brought to the pubic arch, the remaining delivery of the head will be accomplished in the same manner as mentioned in the occipito-sacral position. And, when the head is near the inferior strait, no attempts must be made to rotate the *occiput* under the pubic arch before extracting, lest the child's neck be dislocated; though careful efforts may be made to bring the vertex into the hollow of the sacrum.

FIG. 77.



RIGHT OCCIPITO-POSTERIOR POSITION.

FIG. 78.

In this position the blades will be introduced somewhat similar to the mode laid down under the right occipito-anterior. When the branches are correctly adjusted and locked, the soft parts will be considerably pressed upon, the pivot will look upward and to the left, the handles will be very much depressed, and the blades, as in the

preceding position, will not at first be exactly in the occipito-mental

direction. (*Fig. 80.*) Traction and rotation having brought the forehead under the pubic arch, the remainder of the operation will be the same as in the occipito-sacral position.

OCCIPITO-SACRAL POSITION.

FIG. 79.

In this position the blades are to be applied somewhat similar to the manner named under the occipito-pubic, but with the concave edges of the blades looking toward the child's *forehead* instead of its occiput. When properly adjusted, the concave edges of the blades will be directed toward the pubic arch, the pivot will look upward, and the handles will be depressed so far backward upon the perineum as frequently to produce a degree of pain. The traction, in this instance, as well as in the two preceding positions, after rotation has been effected, is not to be made in the direction of the pelvic inferior axis. The occiput will have to be the first delivered, and to accomplish this

it must traverse over the sacrum and perineum. The handles will, therefore, at first, be carried upward so as to produce increased flexion, and bring the occipito-mental diameter parallel with the axis of the inferior strait. This will advance the occiput over the posterior commissure of the vulva, when the handles must be depressed in order to permit the extension of the head to take place, which terminates the operation.

FIG. 80.

As in these occipito-posterior positions the perineum is greatly dilated, the operator must proceed very patiently and carefully, being especially observant that the proper support be given to it as the head is passing over, lest it be lacerated. After the occiput has been delivered, should there be a delay in the extension, as the instrument is depressed, a sufficient degree of traction downward and backward may be made, to enable the forehead, face, and chin, to pass from

under the pubic arch. The rest of the labor is terminated as in ordinary cases.

Fig. 81 shows the forceps applied in an occipito-posterior position after rotation.

LEFT OCCIPITO-TRANSVERSE POSITION.

Occasionally the head will be found lying transversely within the pelvic cavity; the occiput may be directed toward one ischium, and the forehead toward the other. In the present position, the occiput will lie against the left ischium, and the forehead against the right, in a line with the transverse diameter of the pelvis. In each transverse position the rotation must bring the occiput, and consequently the concave edges of the forcep-blades, to the arch of the pubes, and by recollecting this, it may at once be determined how to apply the blades.

In the left occipito-transverse position, the male blade will be applied to the lower and left side of the child's head, after which the female blade will be applied to its upper and right side. In order to effect the application with as little difficulty as possible, pass the male blade within the left lateral and posterior part of the vagina, along the left sacro-iliac symphysis, and when it has entered sufficiently, carefully move the blade to the hollow of the sacrum, and its concave surface will be over the left side of the child's head. Having an assistant to

hold this, introduce the female blade along the right anterior part of the pelvis, behind the right acetabulum, and by gentle efforts work it gradually to the symphysis pubis, that its concave surface may be applied over the right side of the child's head. When the blades are properly adjusted, they will lock without any difficulty, and the pivot will be directed toward the left thigh of the mother.

Traction must now be made in the direction of the pelvic axis corresponding to that part of it, however, in which the head is situated, and at the same time rotation from left to right should be slowly and gently attempted. When this has been effected, the remainder of the delivery will be terminated in the usual manner.

Professor Meigs observes, that in this position, when the male branch is introduced as above, the handle is strongly abducted toward the left thigh and interferes with the depression and consequently the application of the female branch, and to avoid this difficulty, he advises the female blade to be the first introduced. His method of application is thus: "Take the female or upper blade in the right hand, and introduce it into the posterior and right side of the vagina, conducting its point as near as may be to the chin, and over the face to the right side of the head behind the pubis, leaving the handle to project toward the left thigh. Next, take the male blade into the right hand, and, turning the concave edge of the new curve downward, insert the point into the right side of the vagina, below the female branch. Let the fetal face of the clamp apply itself to the convexity of the head, and slide it onward, and, in proportion as it enters, make it sweep round the crown of the head toward the back of the pelvis. In effecting this, the handle comes gradually down as the clamp gets on the left side of the cranium, and at last the lock is found to be where it ought to be, namely, under the upper or female blade, with which it is then locked." This, undoubtedly, appears to be the better method of introducing the blades, but, as with all other cases, the practitioner who is well versed in the general principles of these operations will be governed by the peculiar circumstances attending each individual case.

RIGHT OCCIPITO-TRANSVERSE POSITION.

In this position the head lies in the direction of the pelvic transverse diameter, the occiput resting against the right ischium, and the forehead against the left. The application of the forceps is similar to the preceding, with the exception that the female blade must be

applied to the right side of the child's head, along the posterior part of the pelvis, while the male blade must be over the left side of the head and behind the pubic symphysis. The male branch is generally the first introduced, though some authors advise the female. As before stated, it will commonly be found more advantageous to enter that blade first, which is of the most difficult application, being particular, however, that the introduction be so managed as to cause no difficulty in the locking.

The same manipulation will be required, as in the preceding position, excepting that the rotation must be made from right to left, in order to carry the occiput under the pubic arch; this accomplished, the labor must be terminated as usual.

Trouble in locking the forceps is sometimes encountered in occipito-anterior or posterior positions, due to the ends of the blades coming in contact with the maternal sacrum. A lowering of the handles will render it possible to introduce them higher in the pelvis, and thus readily overcome the difficulty.

CHAPTER XLV.

MODE OF APPLYING THE FORCEPS AT THE BRIM—IN FACE PRESENTATIONS, AND IN PELVIC PRESENTATIONS.

WHEN the HEAD IS AT THE SUPERIOR STRAIT, the pelvis being of normal size, and circumstances occur requiring the delivery to be expedited, turning should always be preferred to the use of the forceps. But when the head has engaged in this strait and descended so low as to render the operation of turning impossible, the os uteri being dilatable, and immediate delivery necessary, the long forceps may be frequently employed with advantage, even though the head has not advanced so far within the cavity, as to enable an ear to be felt. They may likewise be applied with benefit in cases where the antero-posterior diameter of the superior strait is only three and one-fourth or three and a half inches, and the natural efforts are insufficient to advance the head. To these conditions, therefore, should the application of the forceps at the brim be limited.

It must not be supposed that an operation at the brim, with this instrument, is an easy one; on the contrary it is both difficult and hazardous. The position of the head above the brim can not be easily ascertained, and if it could be, it would make but little difference, as the forceps can be applied only along the sides of the pelvis; consequently, the head may be grasped by the blades in its bi-parietal diameter, or in its occipito-frontal, the latter more frequently. The mobility of the head, when not held by the brim, also renders the adjustment of the blades a troublesome matter, and frequently, their hold on the head being imperfect, as soon as tractions are made, they may suddenly slip and seriously injure the cervix. Hence, when it becomes necessary to use the instrument at this point, the operator should proceed carefully and judiciously.

The difference between the application of the forceps at the brim, and at the outlet, is, that in the former, the whole hand must be carried within the vagina, and two or three fingers be passed as high up as possible between the cervix and head of the child, and the instrument is to be introduced along the sides of the pelvis, so that a blade will be applied within each ilium. When properly adjusted they will lock more or less readily, and the handles will be depressed backward as far as possible, that the blades may take the direction of the superior pelvic axis. Sufficient compression should be exerted on the handles to hold the head securely, and the traction should be made, as in the other instances, not by sudden, short jerks, nor by any forcible measures, but by a full, slow, regular motion from handle to handle, making traction in the direction of the axis of the brim.

If the instrument does not lock readily, no force or twisting must be used to effect it, but the operator should withdraw the blade last introduced and reapply it; and this had better be repeated several times, than to endanger laceration of the cervix or soft parts by forcible and unnecessary endeavors to lock the branches.

Should the head lie with one parietal protuberance resting on the pubis, and the other on the sacral promontory, the forceps will be applied with one blade over the occiput, and the other over the forehead, or, perhaps, over the face. Should the traction and lateral motions communicated to the instrument cause the head to take a diagonal position and descend into the pelvic cavity, the blades may be withdrawn, provided the natural efforts are sufficient to conclude the labor; if not, the blades must be readjusted, but this time on the sides of the head.

If, after having used a justifiable force in the operation, we find it impossible to advance the head, or at least without exerting a power which would unnecessarily expose the mother to dangers, it then becomes our duty to either resort to the perforator or Cesarean section; if the decision is in favor of the perforator, and a delay would not add to the mother's risk, the operator need not act until the stethoscope determines the child's death. We are never to save the life of the child at the expense of the mother's; and, in most cases, the death of the child can be determined by the stethoscope in sufficient time for the mother's safety, before using the perforator.

When the occiput is fastened behind the pubis, and the forehead is in front of the sacral promontory, the blades will then pass over the sides of the head; and when this is ascertained to be the case, the operator may exert more force than before, and probably the difficulty will be more readily overcome. When the head is locked at the brim, Dewees advises us—after having applied the forceps—to first elevate the head, by gently carrying the handles from side to side, at the same time pushing the instrument upward. This may be beneficial in some cases, but usually, where the operation will prove successful, as the handles are rotated from side to side with sufficient traction, the head disengages, rotates, if necessary, to the oblique diameter, and descends into the pelvic cavity.

The forceps may sometimes be required in FACE PRESENTATIONS, in which case the blades are to be applied over the ears of the child, similar to the manner named in vertex presentations; being careful so to adjust them as to bring the chin toward the pubic arch. And in all operations when the face presents, the operator should proceed slowly, so as to permit the body to undergo a rotation, and thus prevent a twisting or dislocation of the neck.

LEFT MENTO-ILIAC POSITION.—(*Fig. 82.*)

As the chin is the part to be brought to the pubic arch in this position, the male or lower blade will be passed in front of the sacrum, and over the right side of the child's head, as much as possible in the occipito-mental direction. An assistant holding this, the female branch will be gradually insinuated anteriorly, over the left side of the child's head, and when the two are properly adjusted they will readily lock. The concave edges of the blades will then be directed to the left of the pelvis, and the pivot will look toward the maternal left thigh; both of these may also be directed upward, if, instead of a

FIG. 82.

complete transverse position, the chin is placed somewhat anteriorly, in a line with the oblique diameter of the pelvis. The handles must then be rotated from below upward, and from left to right, gradually bringing the chin, as well as the concave edges of the blades, under the pubic arch: this having been effected, traction must be made directly forward and slightly downward, to free the chin from under the arch, after which the handles must be slowly elevated to gradually flex the chin, and which motion causes the head to pass successively over the hollow of the sacrum, perineum, and posterior com-

missure of the vulva, while at the same time the several parts of the face are disengaged in succession.

RIGHT MENTO-ILIAC POSITION.*

In this position the operation will be very nearly similar to the preceding one; the female blade will be the first applied along the

* MENTO-PUBIC POSITION.

The chin being placed at the symphysis pubis, and the forehead at the sacrum. In this position, or when the face has assumed it, the head having descended into the pelvic cavity and performed its movement of rotation, the forceps may be more easily applied than in the two preceding positions. The male blade must be applied along the left side of the pelvis, grasping the right side of the child's head, and the female blade must be passed along the right side of the pelvis to grasp the left side of the child's head. Traction forward and slightly downward must then be made, to disengage the chin from under the pubic arch, after which, elevate the handles, thereby effecting at the same time flexion and the liberation of the head. Indeed, this is but a repetition of what has already been stated above; but, as a matter of reference, it has been deemed better to retain it.

MENTO-SACRAL POSITION.

The chin being placed at the sacrum, and the forehead at the symphysis pubis. This is a position with which I have never met; and were it not that cases have been recorded by individuals of eminence and undoubted authority, I should be very much inclined to doubt the possibility of its occurrence, except, perhaps, in case of a very small child passing through an exceedingly large pelvis.

However, should such a position be met with, requiring the use of the forceps, it is recommended to introduce the male blade along the left side of the pelvis and on the left side of the child's head, and the female blade along the right side of the pelvis on

posterior part of the pelvis to the left side of the child's head, while the male blade will be carefully guided over the right side. When correctly adjusted, they will lock, the pivot being directed toward the mother's right thigh. Rotation may be made from below upward and from right to left, until the chin is brought to the pubic symphysis, when the rest of the operation will be the same as in the one previous.

In each of these mento-iliac positions, should the face not have arrived at the inferior strait, it will be proper to conduct it there by tractions and lateral motions, the same as in vertex presentations; after which operate as recommended. Some authors reverse the order of introducing the blades, preferring to use the male blade first, in the right mento-iliac position, and the female, first, in the left mento-iliac. The operator will employ his own judgment in this matter, always bearing in mind the rule to enter the blade of more difficult application first.

The FACE MAY BE ABOVE THE SUPERIOR STRAIT, and *movable*. If the methods heretofore advised for changing it to a vertex presentation do not succeed, and pelvic version can not be accomplished, it has been recommended to attempt the delivery by the forceps. This, however, will more frequently be found impracticable, the perforator being required in the majority of instances. When the head is thus situated above the brim, the face usually presents in a transverse direction, and the forceps would have to be applied with one blade over the forehead and top of the head, and the other over the chin, pressing upon the child's neck; so that, beside the danger of the blades slipping from these parts, any efficient degree of compression or traction would almost certainly occasion the death of the child.

The same may be said of those cases where the HEAD HAS PARTLY ENTERED THE SUPERIOR STRAIT; but there is a greater possibility of success, if the blades can be applied upon the sides of the head; in which case the mode of application will be the same as in the preceding face positions. In each of the above conditions it will be necessary to introduce the whole hand within the vagina, as a guide to the forcep-blades.

In the last condition, the head being partly within the cavity and

the right side of the head. When properly adjusted, the handles will be strongly depressed against the perineum. The face having reached the outlet, the handles must at first be elevated so as to pass the chin over the perineum and posterior commissure; this having been accomplished, depress the handles, which, with a degree of traction, will flex the chin, and disengage the head from its position at the pubes.

partly within the brim, but with the CHIN DIRECTED TO THE SACRUM, and it being impossible to change the position to a vertex presentation, or to accomplish pelvic version, it has been recommended to slowly and carefully rotate the chin to the pubis, as the head is made to descend by the forceps. I consider this not only a difficult task, but almost an impossibility, at least as far as safety to the child is concerned; and, as a general rule, when it becomes necessary to expedite delivery in these cases, I believe it will be found that the perforator will ultimately be required before the labor can be terminated.

In PELVIC PRESENTATIONS, or in cases where pelvic version has been performed, it not unfrequently occurs, that after the expulsion of the body, there is a delay or difficulty attending the delivery of the head, in which cases, should the accoucheur not be able to remove the obstruction by flexing the head with his hand, as heretofore described, he will have to employ the forceps. Hence, as a very short delay may prove fatal to the child, the most prudent course to adopt, in all these labors, is to have the instrument at hand at as early a period as possible, after their character has been ascertained.

In these labors, the head may be found in one of two positions, viz.: with the occiput to the pubic arch, and the face in the hollow of the sacrum, and which is always the most desirable position; or, with the face to the pubis and the occiput in the hollow of the sacrum—a most undesirable position. If the forceps be required to deliver the head, the rules for operating are similar to those given in vertex presentation, thus:

OCCIPITO-PUBIC POSITION.

In which the occiput is to the pubis, and the face to the sacrum. Carefully envelop the arms and body of the child in a napkin, and carry it upward, or toward the mother's abdomen, but not so far as to endanger its neck; then, let an assistant hold the child in this position, that its body may not be in the way of the operator. The latter having introduced two or three fingers of his right hand along the inferior and left side of the vagina, as a guide to the forcep-blades, will, with his left hand, carefully apply the blade of the male branch upon the right side of the child's head. Then intrust this to the care of an assistant, who will depress it somewhat to permit the application of the female blade. This will be introduced, being held by the right hand, and guided by the fingers of the left hand, along the

inferior and right side of the vagina, and thence upon the left side of the head. When properly applied, the forcep-blades will grasp the head in its occipito-mental diameter, and will lock readily. Holding the instrument in the manner heretofore recommended, the operator will commence his tractions and oscillatory movements, and as the head emerges the handles must be gradually elevated, the same as in occipito-anterior positions, by which the chin, face, forehead, and vertex, successively, pass over the perineum and posterior commissure, and the delivery will be thus terminated.

Should the occiput be directed to the left, or right lateral-anterior portion of the pelvis, the operator will be governed by the above rules, as well as those named for occipito-anterior positions, being careful to so introduce the blades, that, at the termination of the delivery, their concave edges, together with the child's occiput, will be brought under the pubic arch.

OCCIPITO-SACRAL POSITION.

In which the face is to the pubis, and the occiput to the sacrum. This is a very unfortunate position, and one which may prove very painful to the female, and troublesome to the practitioner. Although it is more frequently the result of ignorance, or want of skill, on the part of the accoucheur, yet it will sometimes occur in the hands of the most skillful. In this position, the body of the child being enveloped in a cloth, as before, must be carried backward, so that its back will rest against the perineum of the mother. The blades are introduced as in the previous position, in front of the child's thorax, the male blade along the left side of the pelvis, and on the left side of the child's head, and the female blade along the right side of the pelvis, and on the right side of the child's head. The instrument being properly applied, and the head brought to the outlet, instead of elevating the handles to pass the occiput over the perineum, they must be strongly depressed downward, with sufficient traction, so as to cause the chin, face, forehead, and vertex to pass successively from under the pubic arch, while at the same time the occiput is made to revolve on its axis, in front of, and upon the perineum.

If the occiput be directed to the left, or right lateral-posterior portion of the pelvis, the above rules, together with those given in occipito-posterior positions, will be sufficient to guide the educated practitioner.

In addition to the preceding instances, the forceps have been found

occasionally advantageous in irregular presentations of the head, as of the ear, forehead, etc., in which manual endeavors to correct the position have failed; and also in some cases of diminished size of the diameters of the inferior strait. Whatever circumstances may present during labor, requiring a resort to the forceps, the practitioner will apply them according to the peculiar nature of the case, being, however, always governed by the rules already explained.

CHAPTER XLVI.

CRANIOTOMY—PERFORATOR—CROTCHET—CESAREAN OPERATION— SYMPHYSEOTOMY.

CRANIOTOMY is an operation by which the life of the child is destroyed, for the purpose of preserving that of the mother; it is also employed in some cases when the child is dead. The terms *embryulcia*, *embryotomy*, and *cephalotomy*, have been applied to this operation; while the terms *evisceration*, *exvisceration*, and *exenterismus*, have reference to the removal of the contents of the trunk.

As has been heretofore named and repeated, the safety of the mother is the first and essential consideration in the practice of obstetrics, and if, in order to insure this, it becomes necessary to sacrifice the child, however painful or revolting to the feelings of the operators this unpleasant task may be, he must not shrink from his duty, nor hesitate to adopt every measure in consonance with the preservation of his patient. Beside, it must be recollected that the death of the child is certain, in cases where craniotomy is admissible; it can not be saved by any means, unless we except the Cesarean operation, which proves fatal, on an average, to the child once in every $3\frac{1}{2}$ cases—to the mother once in every $2\frac{1}{3}$. The operation of craniotomy is not to be undertaken heedlessly, nor without due consideration, and a proper consultation with one or more experienced accoucheurs; and is only to be attempted when both mother and child would be destroyed, were the labor left to the natural efforts, and when version, or delivery by the forceps can not be accomplished, and the pelvic diameters are sufficiently spacious to permit the extraction of the mutilated infant.

According to Churchill, craniotomy has been performed in British practice 270 times in 54,485 cases of labor, or about 1 in $201\frac{1}{3}$; in

French practice 30 times in 36,169 labors, or 1 in 1,205 $\frac{2}{3}$; in German practice 132 times in 256,655 labors, or 1 in 1,944 $\frac{1}{3}$; making a total of 347,309 labors, in which the operation was performed in 432, or about 1 in 803 $\frac{2}{3}$. The results to the mother have been 60 deaths in 303 craniotomy cases, or about 1 in 5. The operation, therefore, as compared with the employment of the forceps, is less favorable; and much of this mortality may be owing to the fact, that the feeling and humane obstetrician being unwilling to take the life of the child, even in so justifiable a cause, has hesitated to perforate until assured of its death; and the delay thus occasioned has rendered the operation much more unfavorable to the mother, than if it had been earlier undertaken.

Perforation of the fetal skull is generally advised in cases of diminished pelvic diameters, but the degree of this diminution is not positively settled. Thus, Dr. Osborn considers the operation necessary when the antero-posterior diameter is not less than 2 $\frac{3}{4}$ inches. The smallest diameter through which a living child can pass, is stated by Dr. Clarke, to be 3 $\frac{1}{2}$ inches; by Dr. Burns 3 $\frac{1}{4}$; by Dr. Le Roy 3 $\frac{1}{4}$; by Dr. Atkin 3; by Dr. Ritgen 2; these differences of opinion have, probably, resulted from the various sizes of the fetal heads met with by each practitioner, as well as their degree of skillfulness in the application and use of the forceps. Within a few years past, in many instances of pelvic deformity in which perforation of the head would, previously, have been undertaken, turning has been successfully employed, and the degree of measurement of the pelvic antero-posterior diameter in which craniotomy may be performed, is at this day, placed at from 1 $\frac{1}{2}$ to 2 $\frac{3}{4}$ inches.

As a general rule, where the superior antero-posterior diameter of the pelvis is contracted to about three and a half inches, and when the forceps fail to extract the fetal head, this being of usual size, the perforator will be required; though it must be remembered, that with such a pelvic measurement, there is a possibility of extraction by turning, or, with the forceps. But when the extent of this small diameter is reduced, to two and three-quarter inches, the forceps can usually be of no avail, and craniotomy will necessarily be required. When the pelvic contraction is extraordinarily great, it will be impossible to extract even a mutilated child, in which case, the Cesarean operation is recommended. Dewees considers the operation of craniotomy inadmissible where the diameter measures only two inches; Baudelocque limits it to one and two-thirds of an inch; and Davis, to one inch. The limit named by Baudelocque is probably the most correct.

Craniotomy may be performed—in all cases of deformed pelvis—whether of the cavity or of the straits, in which delivery can not be effected naturally, by turning, or by the forceps; in cases of pelvic tumors or other abnormal growths, which present an obstacle to the expulsion of the child by other means—either natural or artificial; in cases of tedious and painful labor, when the child is dead, and can not be removed by the forceps; in cases of hydrocephalus, when the head can not pass through the pelvis; in cases of ruptured uterus, hemorrhage, convulsions, etc., where the life of the woman is endangered, requiring immediate delivery, and where it is impossible to use the forceps; in cases where an extremity descends along with the head, causing an impaction which can not be overcome by the forceps; in pelvic labors, when, after the expulsion of the body, the head can not be extracted by the forceps; in cases where the head, remaining within the pelvis, has been separated from the body; and, in all cases, where from exhaustion, irregular vertex presentations, or other conditions, the patient is placed in imminent danger, and in which the forceps can not be applied, or, in which the circumstances of the case contra-indicate their employment, as well as that of version.

The practitioner who undertakes the operation of craniotomy, must not be too hasty in his conclusions, nor in his attempts at operating—he must be positive that it is imperatively necessary, especially if the child be living—to destroy a living child, without undoubted evidence that no other method will save the mother's life, is a criminal act—it is murder. When the uterine contractions have been powerful and long continued, without any advance of the head, he will be justified in terminating the labor by the forceps, if possible, or if not, by the perforator and crotchet. The same may be said, in cases where, from exhaustion, uterine inertia, or other causes, endangering the mother, and when there is little or no hope for the preservation of the child, the forceps are contra-indicated. Nor should the operator hesitate to act at once, in those cases where he clearly ascertains at an early period that the child can not be delivered except by craniotomy—as, for instance, in an enormous hydrocephalic head, in a small pelvis, in a large head firmly ossified, etc. To delay the operation in these cases until dangerous symptoms manifest themselves, would be to unjustly compromise the mother's life—while prompt action, when her system has not yet become depressed, and is capable of more securely withstanding the shock of the operation, will be the wiser and more prudent course.

In cases requiring immediate interference, at an early period of

labor, the operation must not be attempted until the os uteri is sufficiently dilated and fully dilatable. In all other cases we must be

FIG. 83.

governed by the circumstances connected with them, making endeavors to deliver by the forceps if there is the slightest chance of these being made available. The instruments used in the operation of craniotomy are the perforator, or Smellie's perforating forceps, and the crotchet. Professor Meigs recommends the use of a perforating trocar or drill (see page 86), made especially for this purpose; by the use of this instrument we bore through the skull, through which the opening is enlarged by a knife secured in the handle, and acted upon by a spring; instead of the crotchet, he has invented two

FIG. 84.

FIG. 85.

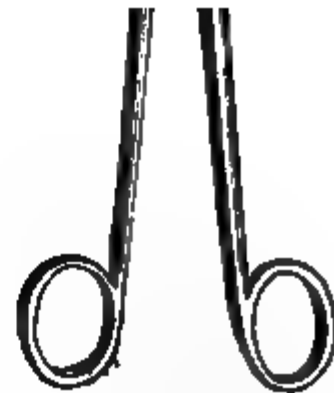


SIMPSON'S CRANIOCLAST.

embryotomy forceps, one of which is straight, and the other curved; each of these are serrated on their inner jaws, to enable them to take a very sure and strong hold upon the cranial bones, and are rounded on their

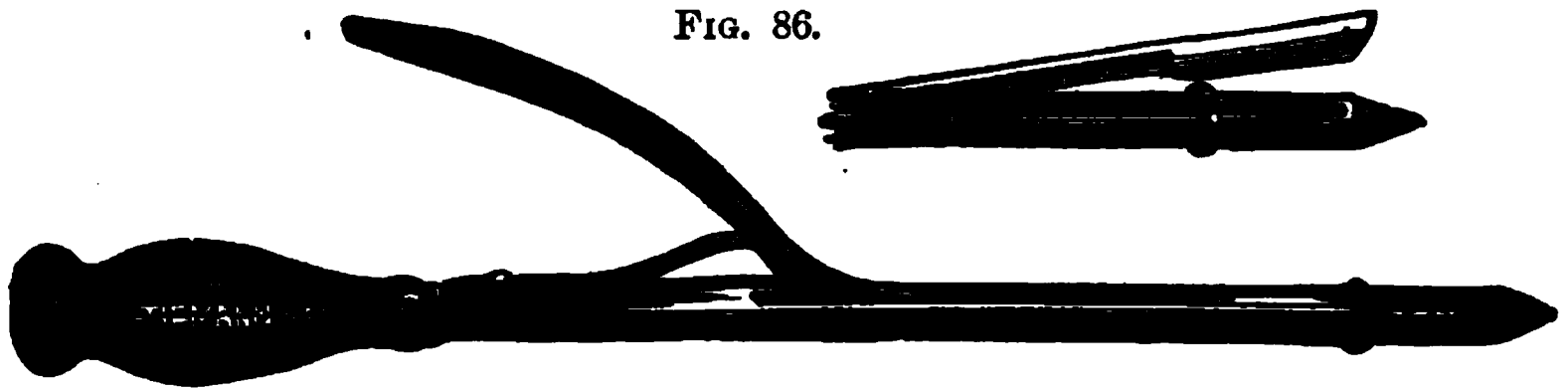
SIMPSON'S PERFORATOR. SMELLIE'S PERFORATOR.

sides, in order to prevent them from taking hold of any of the maternal tissues. These he considers superior to, and much safer than, the



ordinary perforating scissors and crotchet. Other instruments have been presented to the profession, as the cephalotribe, cranioclast, cutting hook for decollation, or amputating limbs, etc., but they are rarely employed, though some of them are very useful. The cephalotribe is for grasping and crushing the fetal head, including its base, and is undoubtedly of value in cases where it becomes necessary to diminish the size of the head. It does not expose the female to the risks of following the use of the crotchet, does not

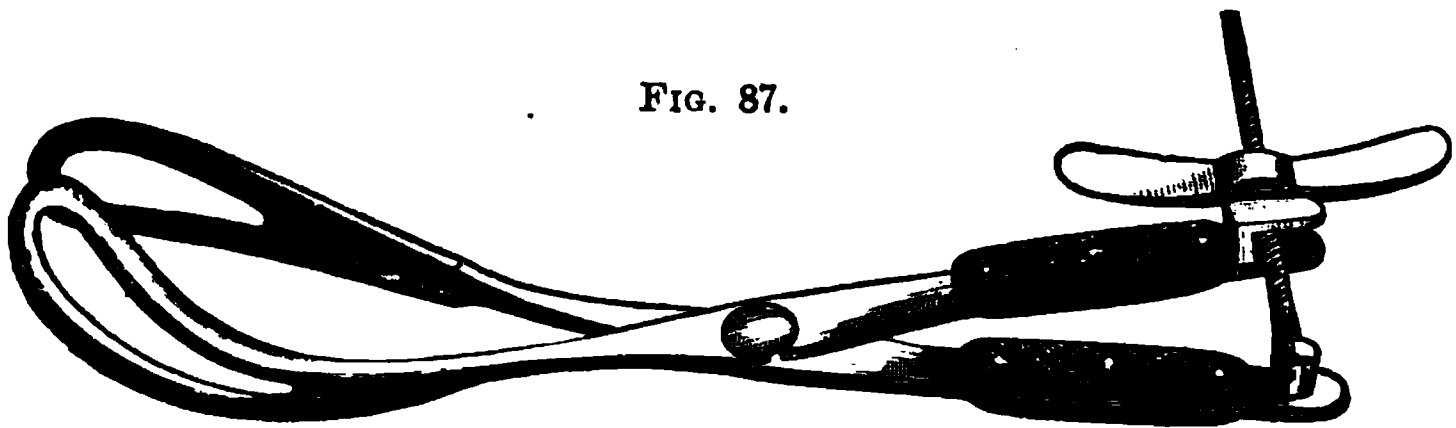
FIG. 86.



THOMAS' PERFORATOR.

require the fatiguing efforts of craniotomy, and can be employed in cases where this operation could not be successfully performed. There are several varieties of this instrument before the profession, the best of which are Lusk's (*Fig. 87*), Simpson's, Hicks', Kidd's and Lazarewitch's. Its use, however, has not come fully into practice, though medical men are beginning to appreciate its usefulness, under the improved forms that have more recently been given to it. The craniotomy or embryotomy forceps are very useful in dislodging the head after the skull has been perforated.

FIG. 87.



LUSK'S CEPHALOTRIBE.

The *dangers* to which craniotomy exposes a female are, injury to the vagina or uterus, from slipping of the perforator or crotchet; laceration of the perineum, from the employment of improper extracting force; subsequent tendency to inflammation of the vagina or uterus; perforation of the bladder, especially when the operation has been carelessly or too forcibly performed; and the shock to the nervous system is usually much greater than in turning, or in the use of the forceps. Instances have occurred where, from a neglect to completely

break down the brain and medulla oblongata, the child has been born breathing and even crying.

MODE OF OPERATING.—Previous to operating, the bladder and rectum of the patient must be thoroughly evacuated. Then she must be placed in the position named for a forceps operation, with the hips over the edge of the bed, and some cloths under her to receive

FIG. 88.

the pieces of brain, etc., which are discharged. An assistant should place his hands upon the abdomen, and maintain them there, during the whole of the operation, to fix and steady the uterus. Anæsthesia should be produced, if the patient be in a condition not contra-indicating it; some writers entertain objection to it, from the fact that extensive injury might be done to the maternal tissues while she lies in an unconscious state, and no timely warnings could be made, to announce to the operator when the danger from this circumstance commenced; no such accident, however, is likely to attend the manipulation of the careful operator, while with its administration the dread of the operation is largely overcome, as well as the mental suffering and unpleasant after-thought.

Introduce two fingers of the left hand within the vagina, and carry them upward until they come in contact with the part to be perforated.

SIMPSON'S
CRANIOTOMY
FORCEPS.

FIG. 89.

THOMAS'
CRANIOTOMY
FORCEPS.

This should be the most depending portion of the head, and a suture or fontanelle should be avoided, because after the perforation is effected in one of these, the opening becomes closed from a collapse of the cranial bones, which will prevent the discharge of cerebral matter. Then carry the perforator, which must be warmed and greased, carefully along the inside of the fingers, being particular not to injure any of the parts of the mother, until the sharp point comes in contact (perpendicularly) with the part selected for the incision.

FIG. 90.

Still guarding the instrument from slipping or injuring the mother, press it firmly but moderately against the fetal skull, at the same time giving to it a rapid boring or semi-rotatory motion; a few motions will suffice to pierce the bone, which may be known by the cessation of any further resistance. (*Fig. 90.*) Then push up the scissors until the shoulders or rests at the base of each blade prevent their further advance. Holding one branch of the instrument firmly, with the thumb passed into its eye or ring, the fingers of the other hand still protecting the mother from injury, by being placed upon the elbows or rests as

they move, to ascertain that they do not leave the skull—an assistant will take hold of the other branch, and separate it from its fellow to an extent of three inches, and which will cause the blades to make an incision about an inch long. (*Fig. 91.*)

Then, without withdrawing the instrument from the vagina, turn it round, and place its point upon the outer surface of the skull, so as to form another incision at right angles with the first, and crossing it, and which is to be done in a similar and guarded manner, as before. This having been accomplished, pass the blade through the crucial incision, within the skull, and thoroughly break down the brain, by alternately opening and shutting the blades, and turning them rapidly round in various directions; and be sure to cut across the medulla oblongata, so as to completely destroy the life of the child. The scissors will now be withdrawn, together with the fingers covering their cutting edges.

If there exists no necessity for immediate delivery after the destruction of the brain, the operator may wait a reasonable time to ascertain whether the natural powers will be sufficient to terminate it. But if

the operation has been commenced after symptoms of exhaustion or other serious symptoms have manifested themselves, he will proceed, without delay, to finish the labor.

Reintroducing the fingers of the left hand, the crotchet, having been previously warmed, must be passed along them into the cranium, and if

FIG. 91.

the breaking down of the cerebral mass was not completely effected by the scissors, it may now be by the crotchet. After which, insert the point of the crotchet on the internal surface of the bone, keeping a finger of the left hand upon the head externally, and opposite to the inserted point of the instrument, in order to cover it, and prevent injury to the maternal parts, should it slip, or break through the bone. (*Fig. 92.*) Protecting the surrounding parts from injury, by folding the scalp over the edges of the bones, the practitioner will, by a gradual, steady, downward force, applied in the direction of the axis of that part of the pelvic cavity at which the head may be placed, commence the extraction of the bones. He must not pull by jerks, or he will fracture the bones, and the traction must be made during the pains, or, if these are absent, they should be imitated by allowing intervals from time to time during the extraction. Whenever the bone breaks under the crotchet point, this must be applied to some other resisting part of the skull.

Frequently the bones will break and come away by pieces, and then great care should be observed in removing them, whether by the fingers or the bone forceps made for this purpose. If the head does not pass readily, or if a secure purchase can not be made with the crotchet, the craniotomy forceps should be used; or, if delay be not contra-indicated, the structures will become weakened after some hours, which will render them of more easy extraction. But I consider prompt delivery, after perforation of the skull, the better and safer method in all cases.

FIG. 92.

If much delay follows the perforation of the skull, the craniotomy forceps should be called into service at once; they are to be used by passing one blade upon the inner surface, and the other upon the outer surface of the skull, so as to take a firm and secure hold, and then make traction at intervals, the same as with the crotchet. (*Fig. 93.*) After the birth of the head, it should be covered with a cloth, and if there be a delay in the advance of the shoulders, traction may be made upon the neck in the direction of the axis of the brim, or a blunt hook may be passed under one or each axilla, to facilitate their expulsion. Sometimes the trunk will not advance, when it will become necessary to perforate the chest

and remove its contents, as well as those of the abdominal cavity, extracting the ribs by the crotchet, somewhat similar to the removal of the cranial bones.

FIG. 93.

In case of a separation of the head from the body, the latter being delivered, the forceps will require to be applied in order that the head may be held firmly, while the perforator is being used to reduce its size.

After the operation, keep the patient quiet, overcoming the nervous shock by the continuation of the anæsthetic, or after a reasonable time a quarter-grain of Morphia may be administered, or a five-grain dose of the compound powder of Ipecacuanha and Opium, or some similar preparation, and the vagina may be occasionally cleansed by injections of warm water. Should symptoms of inflammation set in, promptly remove them by the proper measures.

CESAREAN OPERATION. The Cesarean section, or hysterotomy, is a less favorable operation to the mother than either of the preceding, and, consequently, is never to be attempted for the purpose of delivering the child, except as a last resource. Though a simple operation, it is exceedingly dangerous, and should never be undertaken except upon justifiable grounds. According to statistics—which are hardly reliable, from the fact that the cases reported are generally the successful ones, a number of the unsuccessful being suppressed—about one mother in two and one-third is saved, and about one child in three and one-third.

The operation is resorted to with a view of effecting delivery with safety to the mother and her offspring, in those cases, where it is impossible to deliver through the natural passages, either by the forceps or perforator. In a pelvis whose superior antero-posterior diameter does not exceed one and a half inches, it will be almost, if not quite impossible, to extract even a mutilated child, without powerful efforts, exposing the mother thereby, to at least as serious results, as would be likely to follow this section. And in such cases the operation will be required whether the child be alive or not. Mollities ossium, or the presence of tumors or other abnormal growths within the pelvis, reducing its diameters, and preventing the advance of the child, may render a resort to this operation necessary, especially when they can not be removed or lessened in size, by other means, heretofore referred to.

When the mother has died suddenly during labor, the child being still alive, the Cesarean operation has frequently been the means of saving it; and in order to afford it every opportunity of being saved, the operation should be performed as promptly as possible. Cases are cited in which the living child has been delivered in this manner in from ten to fifteen minutes after the death of the mother.

The *dangers* to which the Cesarean section exposes the female are, hemorrhage, both from the uterine and abdominal blood-vessels, though fatality from this cause occurs less frequently than was formerly supposed; subsequent inflammation of the uterus, or peritonitis; death from the shock to the nervous system; and, strangulation of a portion of the intestines, which may be held between the lips of the external incision, or that made in the uterus.

The earlier the operation is performed, the more favorable will it be for the mother, because her strength will be less impaired than after a prolonged uterine action; and in cases where it is positively known that the operation must be performed before delivery can be

effected, it should be undertaken at the commencement of labor. The period named by authors as the most favorable for operating, is after full dilatation of the uterus and before the rupture of the membranes, and the longer the operation is delayed after this has taken place, the more unfavorable will it be for the mother.

Several cautions are given, by those who have performed the operation, which it is necessary to be mindful of; according to Ramsbotham, these are: 1st, to avoid dividing the tendinous expansion of the recti muscles forming the linea alba, because from its low degree of organization it would not be so apt to heal as kindly as the muscle itself; 2d, to avoid making the incision so far toward the side as to run the risk of wounding the epigastric artery; 3d, to expose the naked surface of the uterus no longer than is absolutely required, being especially careful to handle the organ as little as possible; 4th, to avoid making the incision at the side of the uterus, or at that part of the organ to which the placenta is attached, on account of its being the most vascular part, and which may be ascertained by the stethoscope; 5th, to avoid wounding the child when incising the uterus; 6th, not to allow much time to elapse between the extraction of the child and that of the placenta; 7th, be especially careful that none of the intestines become included with the lips of either incision, as the risks of strangulation would be added to those of the operation.

Recent reports indicate that nearly seven thousand children are sacrificed annually in the United States by embryotomy; this fact, together with the progress and improvement of modern surgical operations, has inclined many of the best known surgical obstetricians to seek ways and means to overcome this terrible destruction of human life. Premature delivery and abdominal section are the only alternatives to be considered. It is now claimed, by several of the most prominent writers on the subject, that in view of the diminished death rate following the improved Säger-Cesarean operation, craniotomy upon the living child is *never* justifiable. That the child's interests are deserving of some consideration along with those of the mother there can be no doubt, in cases where the disproportion between the head and pelvis will not admit of natural delivery; but I can not concur in the belief that relief should always be sought in abdominal section, or, in other words, that craniotomy, under such circumstances, is *never* justifiable. The condition of the mother should always govern our action in such cases; owing to this fact, the means of relief can not be looked upon as operations of election.

In correspondence with Prof. William H. Wathen, of Louisville, an able supporter of abdominal section, I have been able to glean the following from an article recently written by him. The results of both the Sanger-Cesarean and Porro-Cesarean are given, as well as the indications for each. He refers me to a recent contribution to the *American Journal of Obstetrics*, in which, after considering the subject of Craniotomy, he goes on to say:

“Let us now briefly consider the results to mother and child where the alternatives [to craniotomy] have been adopted. We will not waste time considering the old statistics of Cesarean section, where the operation was performed crudely, with none of the modern or more successful modifications, and generally only as a *dernier resort*, for in such cases it is not possible to get good results. Nor will we consider the results of laparo-elytrotomy; for this operation is too complicated for general adoption, and in the practice of expert operators has not given as good results as the improved Cesarean section or Porro’s operation. Nor is it hardly fair to include the statistics of the improved Cesarean section or Porro’s operation in the United States, for nearly all these operations have been done after exhausting all other means, with the women nearly dead, and seldom as operations of election.

“The following are the most complete statistics available on the improved Cesarean section, Porro’s operation, and the induction of premature labor, for which I am largely indebted to the courtesy of Dr. R. P. Harris, of Philadelphia:

PORRO-CESAREAN OPERATIONS.

No.	Countries.	Operators.	Localities.	Cases.	Women Saved.	Women Lost.
1	Italy	52	35	92	48	44
2	Austria	15	7	61	43	18
3	Germany.....	27	18	43	22	21
4	France	9	7	17	6	11
5	England	10	2	12	5	7
6	Russia.....	6	4	10	7	3
7	United States.....	9	7	9	2	7
8	Belgium.....	4	3	5	3	2
9	Scotland.....	4	2	5	1	4
10	Switzerland.....	2	2	4	3	1
11	Holland	2	2	2	1	1
12	Australia	2	2	2	2	0
13	Spain.....	1	1	1	0	1
14	Mexico	1	1	1	0	1
15	Japan.....	1	1	1	1	0
				265	144	121

SÄNGER-CESAREAN OPERATION.

No.	Countries.	Operators.	Localities.	Cases.	Women Saved.	Women Lost.
1	Germany.....	44	22	92	79	13
2	Austria.....	13	7	32	26	6
3	United States.....	24	13	32	15	17
4	Russia.....	7	5	10	7	3
5	Holland.....	5	5	9	9	0
6	Italy.....	3	3	7	5	2
7	France.....	2	1	4	2	2
8	England.....	3	2	3	1	2
9	India.....	1	1	2	1	1
10	Switzerland.....	2	1	2	1	1
11	Denmark.....	1	1	1	1	0
				194	147	47

"It will thus be seen that Porro's operation has saved, in all countries, 54.33 per cent. of the mothers, and 82.77 per cent. of all children, or 137.10 lives out of 200 involved, while the improved Cesarean section has saved 75.77 per cent. of the mothers, and 93.81 per cent. of the children, or out of a total of 200 lives has saved 169.58 lives. But if we properly exclude the improved Cesarean operations in the United States, 81.48 per cent. of all the mothers were saved; thus saving, out of 200 lives, 175.29 lives. The above is conclusive that Porro's operation can not be substituted, only in exceptional cases, for Cesarean section, unless future results materially change the statistics."

In closing the article, Dr. Wathen speaks of the conditions in which the Porro operation should be preferred. I quote his words as follows: "That the Porro operation is preferable to the Cesarean section, in some cases, no one will deny, and Säger gives the following indications for its performance:

"1. When the discharge of lochial secretions is rendered difficult or impossible *per vias naturales*—i. e., by stenoses and artesiæ of the cervix and vagina, or by tortuosity and compression of the soft obstetric canal due to a tumor not belonging to the uterus.

"2. By pregnancy in the closed-up half of a *uterus-bicornis*, in which delivery is preferably effected by establishing an artificial opening toward the open half (strictly speaking, this is not a true Porro operation, since the remaining half of the uterus may be again impregnated).

"3. When the infection of the corpus uteri is evident.

“ 4. After repeated classical *sectio Cæsaria*.

“ 5. By serious osteomalacia.

“ When delivery *per vias naturales* is prevented by uterine or abdominal tumors, the alternative to craniotomy is to remove the tumors, if it is possible to do so, otherwise the Porro operation is the proper alternative. Porro's operation is also indicated in a ruptured uterus, where the rent extends through all the coats, whether the child is in the abdominal cavity, the uterus, or has been delivered. If the blood, the bloody serum, and liquor amnii be thoroughly removed from the peritoneal cavity before decomposition or inflammation, the operation offers but few additional dangers and removes many. But the operation should be done immediately, for all the pathological changes are against the late operation. The woman may have recovered from the shock, but adventitious sacs, plastic adhesions, etc., will have formed, will prove troublesome, and will prevent success.

MODE OF OPERATING.—Having previously emptied the bladder and rectum, the female is to be placed upon her back, with her shoulders and head elevated by pillows; she may be in bed, or upon a table with a mattress on it, and may lie lengthwise, or with her hips brought to the edge of the bed, the feet hanging down toward the floor. A table is always preferable, and can be easily improvised by preparing the common table, found in every house, and covering it with blankets and comforters, as need be, to make it comfortable. Ramsbotham advises the temperature of the room to be brought to at least 80° Fahrenheit, and properly disinfected; sulphurous acid gas, generated by burning sulphur, answers every purpose. In order to avoid injury to any of the uterine appendages, the uterus must be brought in the median line, and kept there by the hands of an assistant being placed over it; and to prevent any part of the intestines from insinuating themselves between the uterine and abdominal walls, a second assistant may make pressure with one hand over the uterine fundus. Anæsthesia is undoubtedly of great value in performing this operation. Ether is preferred by some operators; Chloroform, however, is less likely to produce nausea, vomiting and retching, greatly embarrassing the operator. A mixture of the two agents is sometimes used. A profound state of anæsthesia, however, should be induced, regardless of the agent used.

An incision of about six inches in length is now to be made through the abdominal walls, extending from a short distance below the um-

bilicus, to within about two inches of the pubes, as a further extension of it would endanger the bladder. The abdomen should be carefully washed with an antiseptic solution; carbolized water answers a very good purpose. The incision should now be made, from the umbilicus downward in the median line. The parts should be carefully divided, layer by layer, as far as the peritoneum, into which a small aperture is to be cautiously made, sufficiently large to admit the introduction of the index finger of the left hand (or a grooved director) as a director for a probe-pointed bistoury, and to prevent it from wounding the intestines. The peritoneum must be divided until the incision is of the same dimensions with that of the integuments above, when the uterus will be brought into view. An incision of about five or six inches in length is now to be made into the body only of the uterus, carefully dividing layer after layer, until the placenta, or the membranes are brought into view, and which latter may be known by their transparency. Make a slight opening into the membranes, if these have not been ruptured previously, and by means of pieces of soft sponge remove some of the liquor amnii, or it may be more quickly removed by a proper syringe. Then enlarge the orifice in the membranes, withdraw the child, seizing it by the lower extremities, tie the cord, and extract the placenta and membranes, having first twisted them into a cord. Should the placenta, however, present first, it must not be divided, but detached at one side, that the membranes may be reached.

When the membranes are ruptured, the assistants must be careful, in holding the lips of the wound apart, that the abdominal and uterine walls are kept in contact with each other, that none of the amniotic liquid may pass between them into the abdominal cavity. After the removal of the child, the uterus commonly contracts and detaches the placenta; but if this be not effected, it must be accomplished artificially, by making traction on the cord, and peeling off with the fingers. The operator must also ascertain that the canal of the cervix is free, in order that the lochia may escape, and this may be learned by passing a finger through the os uteri from the wound, and one or two of the other hand per vaginam. In the event of permanent obstruction, characterized by marked stenosis, it is suggested the Porro operation be selected.

Any blood or other foreign body which may have passed within the uterine cavity, must be removed, and the wound in the organ must be well cleansed. The contraction of the uterus generally brings

the lips of the wound in contact, so that there will be but little hemorrhage. It is well, however, in the beginning, to throw a temporary rubber ligature about the lower uterine segment, to be tightened in case of emergency. After cleansing the borders of the uterine incision, the wound should be closed with sutures.

The great mortality in this operation heretofore has, no doubt, been largely due to the inability to properly close the uterine incision. The modification of Sanger has done much to overcome this defect, and in order to clearly define the Sanger-Cesarean operation, I quote the following from Lusk, page 430 of his work on Midwifery:

“It is obvious that the classical Cesarean section, even with the addition of the suture and the employment of strict antisepsis, is still far from answering the requirements of a conservative procedure. To place it upon the same plane with other forms of abdominal surgery, it is necessary to devise some means to surely prevent the separation of the uterine wound, which has been found to occur in spite of the suture and the most careful coaptation of the cut surfaces. The secondary gaping is due, in a measure, to the tendency of the external borders of the wound to become everted after section, the wound, in consequence, assuming a prismatic shape, but chiefly to the alternating periods of contraction and relaxation in the uterine muscle itself, whereby the tension of the sutures is subjected to a continual change. Recently both Kehrer and Sanger have proposed modifications in the methods of operating, designed to render more certain the speedy union of the tissues along the line of the incision.

“Sanger, after an exhaustive study of the past history of the uterine suture as employed in cases of Cesarean section, concludes that the prevention of the escape of the lochia from the uterus into the abdominal cavity subsequent to the operation is best secured by the employment of special means for bringing the peritoneal surfaces into immediate contact with one another, as it is a fact, made familiar by Sir Spencer Wells, that two peritoneal surfaces in apposition unite within twenty-four hours. In order to attain this end, Sanger suggested that, after the removal of the child through the ordinary incision, and a temporary elastic ligature had been placed around the cervix, a narrow strip of muscular tissue should be removed by a section running at first parallel to the borders of the wound, but diverging outward as the section approached the peritoneal surface.

“The peritoneum was next to be detached, and allowed to cover the expanded portion of the Y-shaped section. He then advised the introduction of deep uterine sutures, running obliquely through the

uterine tissues to the inner borders of the wound, avoiding, however, the decidua, with a second set of superficial sutures, designed to secure the contact of the peritoneal borders. The principle of subperitoneal muscular resection, as Säger termed his method, has been tested in three instances by Lepold, with the saving of the three mothers as well as the three children. In practice, however, the plan was found to require some modification. Thus Lepold, after raising the peritoneum with tissue forceps from the borders of the wound, separated it by a horizontal incision, made with a bistoury, to the extent of a half-centimeter at the upper and lower angles, and about one centimeter at the middle of the wound. In carrying out this dissection, a layer of muscular tissue, upward of a millimeter in thickness, was removed with the peritoneum. Then, after lifting the detached serous layer, he removed, cutting from within outward, from each side a segment of muscular tissue extending through the entire thickness of the uterine walls—each segment possessing a wedge-shape, with the base above and the apex directed toward the decidua. In this way he obtained two smooth muscular surfaces overlapped by a wide layer of serous membrane. The deep sutures employed were of silver, while the superficial ones were in one case composed of catgut, in the two others of fine silk.”

Should any blood have escaped into the abdominal cavity, remove it by lightly sponging; and, while an assistant retains the intestines in their place, close the wound in the abdomen by as many silver wire sutures as may be necessary, leaving a space at the lower part for the exit of the fluids which escape from the abdomen.* Between and over the sutures, strips of adhesive plaster should be applied, over which may be placed a number of layers of antiseptic gauze, the whole being kept in position by a bandage drawn moderately tight. During the operation care must be taken not to permit the intestines to extrude, and to keep them warm and moist by means of hot flannels applied from time to time upon the abdomen.

Blundell suggests the propriety of rendering the Fallopian tubes impervious, by removing a small portion of their substance on each side, during the operation, thereby preventing the possibility of conception, without destroying the sexual appetite.

* It has been advised to include the peritoneum in the sutures, so that the inner part of the wound will have the peritoneal surfaces in contact, and not to leave an opening for the exit of the fluids, thereby favoring a speedy union; the same as when treating a simple incised wound.

After the operation, the condition of the patient may render the administration of stimulants necessary. When she has been placed in bed, administer an opiate, and treat the case on general principles to lessen irritability, and prevent or allay any febrile or inflammatory symptoms which may come on, treating them promptly and energetically. The patient must be kept quiet, visitors must be excluded from the room, which should be kept rather cool, and any inflammation along the edges of the incision must be at once reduced by cold water, or fomentations, as seems best suited to the case. Small doses of tincture of Aconite, with or without tincture of Gelsemium, will aid considerably in averting inflammation. The diet must be exceedingly light, and the utmost care and attention should be bestowed upon the female. The catheter should be passed until the patient is able to pass her urine without straining; likewise, the bowels should be held in check for several days. The child should be fed until the mother is beyond danger, and in the meantime the milk, should any be present, may be removed by a young puppy, or by a pump made for this purpose.

It is always proper to have warm water on hand, in order to place the child in it, should animation be suspended.

The PORRO OPERATION.—The *Porro-Cesarean* section consists in amputating and removing the uterus, after the delivery of the child, through the abdominal section. The indications for the operation, as well as the statistics relating thereto, have been given in the preceding section. The body of the organ should be dragged through the abdominal incision, and the child delivered as in the Cesarean section; an elastic cord, encircling the cervix, should be tightened, to prevent hemorrhage. The uterus is held in the abdominal incision by a couple of knitting needles, and is then amputated, including the tubes and ovaries. For a full account of this operation, the reader is referred to Prof. Howe's excellent work on Operative Gynæcology, page 187.

The operation of **SYMPHYSEOTOMY**, or an artificial separation of the pubic bones at their symphysis, has been advised in cases of excessive deformity of the pelvis; but as I can not conceive of a case in which it would be justifiable, being attended with many dangers, I shall not enter into any description of it.

LAPARO-ELYTROTOMY.—This is another of the operations advised, where natural delivery is impossible; it has, however, only

been executed a few times. The advantage claimed for it over abdominal section was that the opening of the cavity of the peritoneum could be avoided, as well as incising the uterus. The operation consists in an incision from the pubic symphysis, along the line of Poupart's ligament to the ilium, through the walls of the abdomen to the upper part of the vagina, which is opened. The os and cervix, already dilated, are directed into the wound, and the child extracted therefrom. When the peritoneum is reached, it is pushed away from the line of the incision by raising it.

A necessity for the operations above named may frequently be obviated, where the pelvic measurements are known to be too small, by the induction of premature delivery, or even, in some cases, of abortion.

CHAPTER XLVII.

INDUCTION OF PREMATURE LABOR.

IN cases where it is known that the fetus, at full term, would be unable to pass through the pelvis, either naturally or by the aid of forceps, owing to a deformed condition of the pelvic bones, the INDUCTION OF PREMATURE LABOR is recommended; an operation which has for its object the safety both of the mother and her child. This operation originated in England, where it has been practiced since 1756, at which time, we are told by Denman, a consultation of most eminent practitioners in London was held to determine the question of its morality, safety, and utility; which having been decided affirmatively, the operation was first successfully performed by Dr. Macaulay. From England it was carried into Germany, in 1799, by A. Mai, but was not practiced until in 1804, by Wenzel. In France it was not performed until 1831, by Stoltz, having previously met with much opposition as an immoral and criminal procedure. At this time, however, it is considered by all obstetricians as a perfectly justifiable operation.

The induction of premature labor consists in exciting the uterus to contract, leaving the subsequent expulsion to the natural efforts; consequently, it differs from a "forced delivery," in which nearly the whole process is conducted by artificial means. It is not to be

attempted until at the period of fetal viability, or during the seventh or eighth months. Its intention is to safely deliver the living child, instead of waiting for the natural term, to destroy it by the perforator, and thus expose the mother to much risk; and, also, to save the mother from the hazardous Cesarean operation.

It has been objected, that it is impossible to accurately determine the relative proportions existing between the fetal head and the female pelvis. This is a very trifling objection, and one that should bear no weight at all in the consideration of the question of operating; because these points may be determined with sufficient accuracy for all practical purposes, by the various methods heretofore explained; and should we, even, arrive at a wrong estimate in these measurements, it would be of no great importance; I consider the following reasons, given by Velpeau, as correct, and of much value—he says: “If the pelvis be wider than we thought, premature delivery (at or after the seventh month) is accomplished without risk. If, on the contrary, the narrowing be more considerable, the fetus will certainly perish; but then, had no operation been attempted till the full term, the fetus would equally have been lost, and the mother would have run greater risk.”

But whatever may be the objections raised against this operation, it must always be borne in mind that the results are not so serious to either mother or child, as when pregnancy is permitted to proceed to its full period. Thus, where craniotomy is performed, not only are the infants destroyed, but one in five mothers are lost; where the Cesarean operation is achieved, the children die in the proportion of one in three and a half, and the mothers of one in two and one-third. Where premature labor is effected, more than half of the children are saved, while only one mother in sixteen is lost. In 161 cases of premature delivery, given by Velpeau, eight died, five of which perished from causes not connected with parturition; in 280 cases, given by Figueira, only six were lost. Here, then, are 441 cases of premature delivery, of which only nine died, or about one in fifty. What sane man can, with these results before him, morally or religiously object to an operation so highly favorable to both mother and child? Prof. William Wathen calls attention to Maygrier, who gives the following statistics in induced labor in pelves of 2.73 inches: “Mothers saved, 66.67 per cent.; children saved, 35.30 per cent.—101.97 lives saved out of 200.” These are the best results that have been obtained, and the percentage of lives saved might be materially lowered by deducting those children that died within a few days or weeks after birth.

The induction of premature labor, in cases of malformed pelvis, is to be effected only when the small diameter of the superior strait ranges between two and a half and three inches; under which circumstances it would be impossible for the full developed fetal head to pass naturally, or even with the aid of the forceps. At seven months, according to the researches of several eminent obstetricians, the bi-parietal diameter of the fetal head is from two and a half to two and three-quarter inches, or not quite three inches, and consequently it may pass very readily through a pelvis the smallest diameter of which is contracted to a measurement between two and a half and three inches: a smaller pelvic diameter than this would render the passage of the fetal head impossible even at the seventh month, unless it should be a very small one; but as we have no means of determining this while the fetus is yet within the uterus, the practitioner is necessarily bound to govern himself by the standard measurement as given. The following approximate measurements of the fetal head have been given by M. Figueira, and will undoubtedly be of some utility to the practitioner:

Age of the Fetus.	Bi-parietal Diameter.		Occipito-frontal Diameter.		Occipito-bregmatic Diameter.	
	Inches.	Lines.	Inches.	Lines.	Inches.	Lines.
7th month	2	9	3	8	2	10
7½ "	3		3	9	3	
8th "	3	1	3	10	3	1
8½ "	3	2	4		3	2
9th "	3	4	4		3	4

(See *Diameter of Fetal Head*, page 57.)

Ritgen has given a table of some practical value, relative to the time at which premature delivery may be effected; thus it may be induced at the

	Inches.	Lines.
29th week when the antero-posterior diameter of the pelvis is.....	2	7
30th " " " " " " "	2	8
31st " " " " " " "	2	9
35th " " " " " " "	2	10
36th " " " " " " "	2	11
37th " " " " " " "	3	0

M. Stoltz has given the bi-parietal diameters of the fetal head to be from the

32d to the 33d week of pregnancy.....	2½ inches.
34th " 35th " "	3½ "
36th " 37th " "	3½ "

The rule given by some authors is, when the antero-posterior diameter of the superior strait measures three inches, to delay the operation until the thirty-eighth week, or eighth month; when it measures but two and three-quarter inches, operate at seven and a half months; and when only two and a half inches, operate at the seventh month. If the diameter is less than two inches, an attempt must be made to save the mother's life either by abortion or the Cesarean operation; and I should not hesitate a moment in resorting to the former method, which every accoucheur must acknowledge as being less hazardous in its results than the latter.

In cases where the antero-posterior diameter of the superior strait is ascertained to be three and a quarter inches, and where in previous pregnancy the fetus could be delivered only by a resort to embryotomy, the practitioner is justified in effecting premature labor; but not in primiparæ, with whom delivery is usually possible, even under such circumstances, and with whom it is not advisable to operate when the diameter measures beyond three inches. And in all instances the practitioner should be well assured of the life of the fetus before attempting the operation, bearing in mind that the longer the child is allowed to remain within the uterus, compatible with its safe delivery, the greater will be the chances in favor of its living subsequently. If the existence of a twin pregnancy be *satisfactorily* ascertained, the operation may be dispensed with, because the development, as well as organization of twins, is usually less perfect than in single pregnancies; but from the difficulty in determining twin pregnancies, this rule will seldom prove of any practical importance.

There are other conditions beside that of pelvic contraction, in which the induction of premature labor may be justifiable; as for instance, in cases of excessive vomiting, where no food can be retained upon the stomach, notwithstanding various remedial agents have been administered, and where consequently the life of the mother is threatened by starvation. It is likewise proper in all cases where the continuance of pregnancy adds to the dangers which threaten the life of the female, as in aggravated diseases of the heart; in aneurism, where, from the obstruction to the general circulation occasioned by the enlarged uterus, a rupture of the aneurismal tumor is feared; in strangulated hernia; in excessive serous effusions; in convulsions, especially where they resist the remedial means pursued and recur

frequently, becoming at the same time more and more severe; in uterine hemorrhage, more particularly when owing to the attachment of the placenta over the inner os uteri (placenta prævia); in diminution of the bis-ischiatic diameter; in abdominal or uterine tumors, which interfere with the development of the uterus or the delivery of the fetus at full term; in case there has been a rupture of the uterus in a previous labor; and, indeed, in all cases where the life of the mother is at stake, and can not be saved by any other means. A dead fetus is not of itself a cause for the operation, unless there be other circumstances of a hazardous character attending it. But whatever may be the nature of the case, it must not be forgotten that the practitioner who attempts this operation assumes a very heavy responsibility, one in which a failure, or a fatal result to the mother, may seriously involve his reputation for a life-time; consequently, as a general rule, and more particularly among young practitioners, no operation of the kind should be undertaken without a consultation in the matter, and the sanction of the consulting physicians.

Denman says: "There is another situation in which I have proposed and tried with success the method of bringing on premature labor. Some women who readily conceive, proceed regularly in their pregnancy until they approach their full period, when, without any apparently adequate cause, they have been repeatedly seized with rigor, and the child has instantly died, though it may not have been expelled for some weeks after. In two cases of this kind I have proposed to bring on premature labor when I was certain the child was living, and have succeeded in preserving the life of the children without hazard to the mother. There is always something of doubt in these cases, whether the child might not have been preserved without the operation; but as such cases often come under consideration, and as I am disclosing all that my experience has taught me, it seemed necessary to mention this circumstance." I would remark here that I have seen similar cases, occurring especially after a bleeding for fullness of the head or other unpleasant symptom; but whether they were occasioned by the bleeding I am not prepared to say, but make the suggestion for future investigation: again, I have witnessed a few instances where no bleeding has been performed.

Females sometimes, in a succession of labors, give birth to still-born children, and which is owing, not to pelvic malformity, but to a preternatural energy of the contractions of the uterus, very similar to those induced by Ergot, being permanent, and by constant compression of the cord causing a suspension of the fetal circulation. Premature

delivery has been recommended in such cases, with an intention of lessening the energy of the uterine action, or a hope of finding it less powerful at the seventh or eighth month, in consequence of which the child may probably be saved. But the operation is not justifiable. The disposition to excessive uterine contraction may be overcome by the employment of uterine tonics and antispasmodics during pregnancy; and anodynes during parturition, with rectal injections of the officinal compound tincture of Lobelia and Capsicum, slightly diluted with warm water, and in very severe and obstinate cases, a portion of this tincture may also be administered internally, or the Sp. Tr. of Gelsemium.

It can not be denied that there are several difficulties which interfere in a greater or less degree, with the success of the operation; thus, the size of the pelvis may be inaccurately estimated, and the operation be performed at too late a period, or too early, to insure the subsequent existence of the child. Frequently it is almost if not quite impossible to precisely determine the age of the pregnancy, as women are very apt to be mistaken in their calculations, and the results may be similar to those just mentioned above; but notwithstanding these difficulties, they are by no means of such a nature as to lead us to reject the operation, the results of statistics being greatly in its favor. Again, abnormal presentations, as of the shoulder, breech, etc., are more frequent in premature labors, for which no satisfactory reason has been given, and which generally prove fatal to the child, owing to the constant pressure on the umbilical cord during the passage of the fetal head through the brim; or, where the presentation is natural, the fetus may be destroyed by a long-continued compression of the uterus upon it, owing to the escape of the water and the delay in dilatation of the os uteri. But none of these obstacles are of so grave a nature as to prohibit the operation, because the life of the mother is to be considered as of the first importance, and that of the child as secondary—to be saved, if possible, but always without endangering the mother.

I would refer here to an ancient prejudice which is still very popular, and is even supposed to be true by many physicians; it is, that a child born at the seventh month is more apt to live, than one born at the eighth month of pregnancy. This, however, is very absurd and incorrect; for we would suppose that the longer the intra-uterine life is extended, the greater would be the chances for a perfect development of organization, and consequently of a subsequent independent

existence, and such is actually found to be the case in practice. I am aware that "eighth month children," as they are called, frequently die at a very early age, and I am likewise aware that "seventh month" and "ninth month children" frequently meet with a similar early death; but I have found no peculiar tendency of this kind among those born at the eighth month.

Various methods have been devised and recommended for the premature expulsion of the fetus, some of which may prove safe, as far as the mother is concerned, but are necessarily fatal to the child; while others have in view the safety of both mother and child. The former are seldom employed unless the intention is to produce abortion, previous to the seventh month or viable condition of the child; and it should never be attempted unless the antero-posterior diameter of the superior strait is less than two and a half inches. In these cases the question is between abortion and the Cesarean section; by the former the child is delivered dead, while the hazard to the mother is comparatively small; by the latter, the child has one chance in three of living, while the mother has but one in two and a quarter chances of recovering from the operation. Shall we then sacrifice the child to save the mother, or the mother to save, probably, neither? My own view of the matter corresponds with that of Velpeau, who says: "As regards myself, I avow I can not put in comparison the precious life of a fetus of three, four, five, or six months, a being scarcely differing from a plant, one that is bound by no ties to the external world, with that of an adult woman, whom a thousand social relations interest us to save; therefore, in a case of extreme narrowness of the pelvis, and where it was mathematically demonstrated that delivery at the full period was impossible, I would not hesitate to recommend producing abortion in the first months of gestation."

Abortion may in some cases be effected by warm pediluvia, copious sweating, and drastic purgation, while in others these will produce no influence at all; indeed, many unchaste females are in the habit of producing abortion in the early months of pregnancy whenever this takes place, by such means as named above, yet it is generally accomplished at a great sacrifice to both health and long life. The oil of Savin given in doses of ten drops on sugar, and repeated three times daily for a week or two, will cause abortion, especially in the early months of gestation, in consequence of its destructive influence upon the ovum, yet it frequently fails, and if given in larger quantities is very apt to produce serious inflammation; its action appears to be

more positive in females of a strumous diathesis. Borax and Cinnamon in doses of five grains each, or a mixture of Borax and Ergot, each, in powder, ten grains, powdered Cinnamon one scruple, administered three times a day, will likewise often occasion abortion, by their influence upon the contractile tissue or action of the uterus, yet these compounds sometimes produce irremediable and distressing symptoms. Many other agents have produced abortion as various essential oils, or infusions of emmenagogue herbs, with or without the addition of Yeast, etc., but none of these can be recommended as invariably certain in their results, beside which, they often produce disastrous consequences.

A solution of half a grain, or a grain of Sulphate of Iron in two fluidrachms of water, carefully injected into the pregnant uterus, is much employed among abortionists to effect their object. Another plan, which is considerably used, is to pass up a Simpson's sound into the uterus, feel around with it for the placenta and detach a small portion of its periphery, enough to cause a little blood to flow; in twelve or twenty-four hours, the uterus contracts and sooner or later expels its contents. It is hardly worth while to state to the medical student, the dangers that are apt to follow abortions thus effected, nor the slavery and the legal liabilities to which the operators are subject.

Probably the safest as well as the most certain method is the one pursued by Macauley in 1756—perforation of the membranes by the introduction of a catheter or a canula armed with a trocar; the instrument is introduced into the os uteri, and the membranes pierced by it, care being taken not to injure the parts of the mother. This method is neither painful nor injurious to the mother; by it, the amniotic liquid escapes, the uterine walls retract, dilatation of the os uteri more or less slowly ensues, requiring from twenty to forty hours, and in some instances even sixty; the uterus, irritated by the constant proximity of the fetus, contracts, but is unable to expel its contents until the os uteri has become sufficiently dilated, hence there is frequently excessive hemorrhage from an early detachment of the placenta. This method has been also advised to induce premature delivery, but it should never be adopted after the seventh month, as from the early discharge of the waters and consequent prolonged pressure of the uterus upon the fetus, its life is greatly endangered.

The above methods are among those which have been used at various times for the purpose of producing abortion, but in instances where it is required to save the life of the child, if possible, that is,

after the seventh month, other measures have been recommended, among which may be mentioned the following:

1. Frictions over the fundus uteri to induce contractions, at the same time titillating or irritating the os uteri by one or more fingers introduced into the vagina, has been proposed by D'Outrepoint and Ritgen; this plan, however, is rarely employed, because it seldom effects any uterine contractions, and when these do occur, they are too feeble and evanescent to produce an expulsion of the fetus.

2. It has been suggested by Dr. Hamilton, to introduce a finger or gum-elastic catheter beyond the inner os uteri, and separate the membranes from the internal uterine surface for some two or three inches around, and where labor can be brought on by this mode, it is safe to both mother and child. But it can not be relied upon as an efficient measure, and in cases where it has succeeded, the result was probably brought about by the irritation produced at the cervix. What has been termed catheterization of the uterus has usually been regarded as quite certain in its action. It consists in introducing an elastic catheter or bougie between the membranes and the walls of the uterus, allowing it to remain *in situ* until contractions follow. This method has been improved upon by Professor Lazarewitch, who passes an elastic tube between the uterus and its membranes, from the cervix to the fundus, or as nearly so as possible, and then injects through this tube from eight to ten ounces of warm water; in twelve cases, uterine contraction came on at once, nine of the children were born alive, and none of the mothers died. Two of the cases required a second injection to urge the uterus to greater action. The labors by this method usually come on in from ten to twenty-four hours, and terminate in from sixteen to twenty-four hours. This is not a painful mode, and is supposed by its originator to produce an effect somewhat similar to the natural process, in which he claims, that the initiative step in labor is detachment of the membranes from the uterine wall—that this detachment, as well as uterine contraction, commences at the fundus—and that the contractions are not manifested until the detachment has occurred. Although this method has proved successful in many cases, yet it has in other cases occasioned alarming symptoms, and even death, which should lead to some hesitation in resorting to it.

3. M. Meissner, of Leipsic, has given a plan by which he assures us that, in fourteen cases upon whom it was tried, both mother and child were saved in every instance; it is an improvement upon the method of Macaulay, and has for its object the gradual discharge of

the amniotic liquid, thereby avoiding long-continued pressure upon the fetus. The plan is to puncture the membranes, not at their lowest part, but high up, as near the fundus uteri as possible; and the instrument he employs is a canula about thirteen inches in length, and two lines in diameter, and having a curve corresponding with the segment of a circle whose radius is eight inches. Attached to this canula are two stilets, one bearing at its extremity an olive-shaped button, the other a trocar; a ring is also placed upon the lower extremity of the convex side of the canula, which enables the operator to determine the direction of the curvature when the instrument is within the uterus. The female being placed in an erect position, the operator, stooping down on one knee, proceeds carefully to introduce the canula armed with the olive-shaped button through the os uteri, and as far up between the membranes and uterine walls as possible, say six, eight, or ten inches above the os uteri. This having been accomplished, and also having ascertained that the point of the canula is not in contact with any part of the fetus, the button stilet is withdrawn, and that with the trocar introduced and the membranes punctured. Sometimes, when the cervix is high up, and looking so far backward as to be reached with difficulty, the female will have to sit on the edge of a chair, or assume the recumbent position, in order to enable the practitioner to introduce the canula. After the perforation of the membranes, the trocar-stilet is removed, a small portion of fluid is permitted to pass through the canula, and then this is also withdrawn. The waters by this mode escape gradually, pains usually come on in twenty-four or forty-eight hours, and labor is finished in from thirty-six to sixty hours. This operation has not been very extensively employed, but is preferable to any of the plans heretofore named, although rather difficult to satisfactorily accomplish.

4. Kluge has proposed a mode of inducing uterine contractions without puncturing the membranes, by the introduction of a sponge-tent within the os uteri. The sponge must be soft and fine, of a conical shape, about two inches long, and half an inch in diameter at its base, and a piece of tape must be attached to its base, by means of which it may be removed when required. It may be prepared by soaking a piece of fine sponge in a solution of Gum Arabic, wrapping it round an awl, and tightly binding it on by a string; when dry, it can be cut into any required shape. The female, for a few days previous to the operation, is directed to use the warm-bath, and warm emollient and narcotic vaginal injections; and before introducing the sponge, both the rectum and bladder are to be emptied. She is then

to be placed in a position somewhat similar to that required for the application of the forceps, and the finger of the operator is introduced into the vagina as far as the os uteri to serve as a conductor; with the other hand, a long pair of forceps, holding the piece of sponge, is to be passed along the conducting finger and gradually entered within the canal of the cervix. After holding it there for a few minutes the forceps are to be withdrawn, and the sponge kept in its place by filling the vagina with a large sponge, or pieces of linen, and the whole retained by a proper bandage; the patient is then directed to remain in bed. The fluids of the parts saturate the sponge, which swells up, and consequently dilates the os uteri, and irritates its fibers, which, reacting upon those of the corpus uteri, effects contractions, which usually occur in five or six hours. If, in the course of twenty-four hours, active contractions of the uterus are not excited, the sponge must be removed by means of the tape, and a new and larger piece inserted in its place; this second application is most generally successful. If required, the labor-pains may be increased by titillating the cervix, frictions over the abdomen, and the use of Macrotys or Ergot. This plan is a good one, and certainly preferable to that of puncturing the membranes, yet, it is stated to fail occasionally. Sea tangle-tents have likewise been used for the same purpose, and are said to act better than the sponge, as they give rise to less irritation, dilate the os more gradually, and, when hollow, permit the escape of the discharges.

5. Professor Kiwisch, of Würzburg, recommends the direction of a stream of warm water from a height, by means of a syphon, continuously upon the os uteri; Dr. Smith proposes to improve upon this method by alternating the temperature of the douche from hot to cold. A vessel capable of holding two gallons of water is placed at an elevation of four or five feet above the patient, to which is affixed a flexible tube, about eleven feet in length and half an inch in diameter, the uterine extremity of which terminates in an ivory or bone nozzle five or six inches in length, or is connected with the straight tube of an injecting apparatus, and near the upper end of which a stop-cock is attached. In employing this, two gallons of warm water, about 110° F., are to be placed into the vessel. The uterine extremity of the tube is then passed into the vagina and directed toward the os uteri, the female being in bed, or in an empty hip-bath; holding the tube steadily, the stop-cock is turned, and the stream immediately commences flowing with considerable force against the os uteri, and which is to be continued until the whole two gallons have been dis-

charged. If this is to be followed by a cold douche, the same quantity of cold water is to be poured into the vessel as soon as it is emptied, and allowed to flow in the same manner. The time occupied in the operation is from twenty to thirty minutes, and the only disagreeable sensations experienced are when the warm and cold currents first begin to run. This operation may be repeated two or three times daily, requiring its application from two, to four, eight, or twelve times. It is to be preferred to all others yet named, as its application is simple, and no possible injury can be done to either the mother or child. However, it is not only a troublesome, unpleasant method, but generally quite a tedious one. If expedient, it should be performed at the period in which the catamenia would have appeared in the non-pregnant condition. A syringe capable of maintaining a continuous stream may be substituted for the vessel and tube.

6. The employment of galvanism or electro-magnetism, as suggested by Herder in 1803, has been found efficacious in bringing on uterine contractions, even after other means had failed. This is accomplished by placing one pole of the battery on either side of the uterus, continuing the application of the current for half an hour or an hour each time, and renewing it once or twice daily; the ordinary electro-magnetic apparatus in use is the best form, as repeated shocks prove more effectual and certain in stimulating the uterus to contractions than a continued current. In applying the poles it will be proper to attach to the discs a sponge moistened with water, or salt and water; or pieces of thin flannel likewise moistened may be placed between the discs and the abdomen. Some apply one pole to the neck of the uterus, and the other to the spine or abdomen, immediately above the fundus; but this is unnecessary. Dr. Radford states, "that galvanism not only originates the temporary contractions of the uterus, but also produces such a lasting impression on the organ that pains continue to occur until the labor is terminated. It produces severe pains in the loins, and great bearing down, followed by dilatation of the os, and expulsive pains." I have employed this agent in a few cases, and with invariable success, though the number and intensity of the applications had necessarily to be varied in each. In relation to its influence on the fetus, Dr. Radford, who has made extensive employment of it in midwifery, states that he has never observed that the child in utero has been injured by its use, which gives it a great advantage over the administration of *secale cornutum*, which, in many cases, is destructive of it; he also remarks, "Galvanism is especially advantageous as a general stimulant in all those cases in which the vital

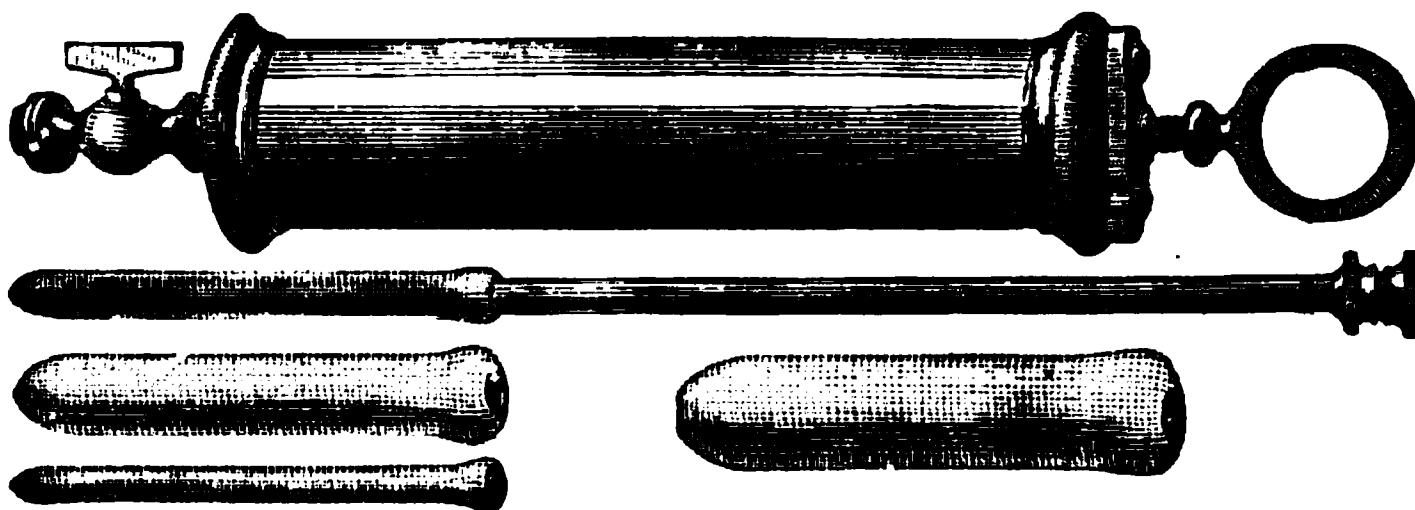
powers are extremely depressed from loss of blood. Its beneficial effects are to be observed in the change of countenance, restoring an animated expression; in its influence on the heart and arteries; in changing the character of respiration; and its warming influence on the general surface. I have several times observed, in cases in which other powerful stimulants have failed to produce any beneficial results, the most decided advantages accrue after its application." It may likewise be employed to effect abortion, when the indications show the necessity for, or justify, the expulsion of the ovum. This method is also somewhat tedious.

7. The fresh Inner Bark of the Root of the Cotton plant is stated by Dr. Bouchelle to have a particular affinity for the sexual organs, modifying their functions in a remarkable manner; that it not only possesses oxytocic properties, invigorating feeble contractions of the uterine fibers, but that it *originates* expulsive contraction at any period of gestation, and will induce *immediate* abortion when taken in the proper quantity, and without any detriment to the health of the female. He states, also, that it was habitually resorted to by slaves in the South as an ecboic for the criminal purpose of inducing abortion, a fact which I have in past years had named to me a number of times by Southern practitioners. Dr. B. infers, from its influence on females, that the use of it destroys the generative capacity, rendering the person sterile, without impairing the health; should this eventually prove to be the case, the bark of cotton root will become a most important article of our materia medica, a boon to physicians, and likewise to females with deformed pelves; and it is to be desired that its value in this matter will be thoroughly investigated. It is used in strong decoction as an ecboic or oxytocic, of which four fluidounces may be taken every twenty or thirty minutes until the desired result is obtained. It is quite difficult to obtain the recent root to use in decoction; owing to this fact, the specific tincture will probably be found the most reliable preparation on the market. It may be used in from five to ten drop doses every two or three hours until the effect is perceptible.

8. Professor Giordano, of Turin, advises the application of solid nitrate of silver to the cervix, as being of easy execution, prompt and complete in its results, and followed by no ill consequences. Having introduced the caustic within the cervix, he imparts to it repeated, but slight, rotatory movements, so that most of the surface may undergo the process of cauterization. This, however, I do not consider a safe method, and it is certainly one for which there is no necessity.

9. Probably the best and most ready method at present known to the profession is the use of India-rubber bags, which act somewhat similarly to the natural bag of waters, and effect safe delivery in from one to six hours, without any danger of injury to the mother or child. These bags are of several sizes, and have, at one extremity, a long elastic tube with stop-cock attached. Commencing with the smallest, this is well oiled, then introduced into the cervix uteri and a little beyond the inner os, and air or warm water is injected into it through the tube. If required, the next size is then employed in the same manner, and so on. Dr. W. Molesworth, of New York city, has made a decided improvement upon these elastic bags in what he terms his "climax dilator," which is more convenient; can be employed with greater facility; does not increase in length, but dilates uniformly from side to side; can be used with either air or warm water, the latter being preferable; and the degree of dilatation of which can at all times be determined by the amount of water employed. It is also exceedingly useful in placenta prævia and other conditions, in which it becomes necessary to promptly effect dilatation of the os uteri, as, in operations for uterine polypus, fibroid tumor, etc.* (See *Fig. 94*).

FIG. 94.



MOLESWORTH'S CLIMAX DILATOR.

After uterine contractions have been fully established by the adoption of either of the above measures, to induce premature delivery, the labor will proceed in the same manner as at full term, and its management, as well as that of the placenta, will also be the same as recommended at that period. As a prematurely delivered child is more feeble than one fully developed, some care will be required in its management; it should be kept warm, allowing it, however, a free use of its limbs, and a wet nurse should always be provided for it, who should be directed to adopt a system of regularity in applying it to the breast, at no time allowing it an excess of aliment.

CHAPTER XLVIII.

PUERPERAL FEVER — PERITONITIS — PUERPERAL SEPTICEMIA —
 INFLAMMATION OF THE UTERINE APPENDAGES—METRITIS
 —UTERINE PHLEBITIS—INFLAMMATION OF THE
 UTERINE ABSORBENTS—TREATMENT
 OF PUERPERAL FEVER.

ONE of the most dangerous forms of disease to which the puerperal woman is liable, is that commonly known as PUERPERAL or CHILD-BED FEVER—concerning which there have been, from time to time, various and discordant opinions expressed by medical writers, as well as sundry modes of treatment recommended, each being based upon the particular theory supported by its originator. This clashing of views has, perhaps, originated from the fact, that the malady termed puerperal fever, has included several phenomena which have not been uniform, and which have yielded to the most opposite plans of treatment—and, each writer being entirely governed in his opinions upon the subject, by the particular symptoms and circumstances presented to his individual notice, has, probably, been induced to infer that, while others have mistaken the true nature of the disease, he has correctly ascertained it, together with the best treatment for its cure. At the present day it is generally acknowledged that the malady varies in its pathological characteristics. It has been variously called *puerperal peritonitis*, *puerperal metrophlebitis*, *puerperal pyemia*, and *puerperal septicemia*; the latter being probably the more correct term, to apply to the severe and rapidly fatal form of the disease which occurs shortly after parturition. Professor J. Matthews Duncan, M. D., of Edinburgh, Scotland, in an address to the British Medical Association at Norwich, August, 1874, in the course of his remarks, observed: “No theory of this subject (child-bed fever) can be regarded as final or sure. But the time has come when obstetricians should try to leave off the use of the convenient term puerperal fever, because it embodies error. There is nothing essentially puerperal known in it; nor is there any thing of the nature of a fever, as that term is generally understood. A new name, already widely used, is to be found in the already comparatively old term pyemia. This new name can be of only temporary utility, but that utility will be very great, and continue till advancing science displaces it by a better, as it should now displace puerperal or

child-bed fever. It will then have served its time by carrying the ideas of generations of practitioners away from the old, flimsy, and extensively erroneous speculations of the past to the more substantial of this day."

Puerperal fever (*pyemia*) has, heretofore, proved very fatal in its result, destroying a large majority of those who have been attacked by it, and has undoubtedly occasioned more than two-thirds of the deaths which have occurred among females at the puerperal period. It is stated* to be more malignant in hospital than in private practice, which may be owing to the congregation of too many patients in a ward, as well as to a neglect of proper ventilation, and thorough and constant cleanliness of the various lying-in apartments. The poorer classes of society, from their indigent mode of living, and the illy-ventilated, unclean, and damp rooms, which their circumstances compel them to occupy, are also said to be more subject to the disease than those who can obtain the proper necessities and conditions for health, and it also proves much more fatal among them.

The attack commonly occurs within two or three days after delivery, but it has been met with previous to labor, and also at the third or fourth week succeeding it, depending upon the peculiar form or variety of the disease, its cause, etc.; and when it does occur, it usually runs its course speedily.

CAUSES.—Puerperal fever most generally prevails as an endemic, and it is not uncommon, at endemical seasons, to observe that nearly every puerperal woman within the abnormal district suffers from an attack. This may be owing to the great susceptibility which the parts must have to diseased action, arising from the nervous shock, the sudden evacuation of the abdominal cavity, the powerful contractions of the uterus and abdominal muscles, and other circumstances connected with labor, and more especially to the wound* in the uterus,

* "But it is not * * * to be supposed that practitioners are not bound by the most solemn considerations to take most scrupulous care against being disseminators of disease; and there is no disease with which they deal, where such care is more imperative in them than puerperal pyemia. The puerperal woman presents in her contused, lacerated, and inevitably wounded passages the most favorable nidus for the reception of morbid material; and the woman suffering from puerperal pyemia in any of its forms, and the patient suffering from some of the allied diseases, present this morbid material in its subtlest and most potent essence. A well-demonstrated communicability arises from this source. No other has been demonstrated, but it is possible that in an ill-managed hospital there may be some other. For the existence of another source, several of the best recent authors offer slight evidence; but, on the other hand, its existence is rendered very doubtful by the alleged absence of pyemia in those surgical hospitals or parts of hospitals where the antiseptic treatment of Lister is properly carried out".—*Prof. J. Matthews Duncan.*

resulting from the detachment of the placenta, to contusion of the lymphatics, or to laceration of any portion of the genital passage, in association with putrefied material from decomposed particles of placental or decidual tissue, or of the lochial discharge, and which is undoubtedly the chief, if not the only, cause of the true puerperal disease; indeed, when we consider all the phenomena present during the birth of a child, and more especially in difficult, and instrumental labors, it is rather a source of astonishment, that the disease is not still more frequently met with. When occurring as an endemic, it is more malignant and fatal in its character than when it exists auto-genetically, and those females more readily fall victims to it, who are exposed to any of the causes hereafter assigned for its spontaneous advent.

Independently of an endemic origin, puerperal fever, it has been stated, may be produced by an exposure to cold, or to dampness; by an omission of the bandage; by the female arising from her bed at too early a period; by allowing her improper food, or stimulants, during the first puerperal week; by violent emotions of the mind, whether of a depressing or exciting character; by a retention of portions of the placenta; by want of cleanliness and ventilation; it may likewise follow hemorrhage, manual or instrumental operations, and, notwithstanding that venesection is frequently recommended as a means to overcome the disease, yet we find that it frequently follows excessive floodings. I have several times noticed a disease resembling it (*intestinal irritation*), to follow a constipated condition of the bowels, in cases where the attending accoucheur had permitted the patient to remain without any alvine evacuation for ten or twelve days. Manual and instrumental labors frequently render the puerperal female especially obnoxious to this disease. And again, it is often impossible to assign any satisfactory cause for its origin.

It has also been supposed to have been produced or modified in its character by the presence of scarlatina, small-pox, etc. That there is a close alliance between it and epidemic erysipelas I have no doubt, and such are the views entertained by most writers and teachers. It is well known that erysipelas has been occasioned by puerperal fever, while on the other hand erysipelas has given rise to puerperal fever. Thus, these two diseases may present themselves as modifications of the same morbid condition of the blood (putrid infection), each one presenting symptoms of a varied character, according to the changes and conditions resulting from age, character of labor, period of attack after delivery, resisting power, temperament, habits of life, predisposition, etc. With

regard to the effects of this same cause of infection, an eminent French physician, who has bestowed considerable attention to its investigation, observes :

“ But this morbid influence once felt, the anatomical modifications which accompany it, having neither constancy nor fixed place of election, it will follow that these manifestations will be expressed by the lesion of the organs whose vitality is excited, and which their irritation predisposes to become the seat of serious changes. In the lying-in women, it will be the lymphatic vessels and veins of the uterus, the uterus itself and peritoneum—hence, puerperal fever with its so frequent complications of lymphangitis or of uterine phlebitis, of metritis and peritonitis. In the wounded, in whom the venous and lymphatic system is injured, it will likewise be lymphangitis, erysipelas, and purulent absorption. On the subject whose skin, hardly excoriated, presents but few irritated lymphatics, it will be lymphangitis and erysipelas. If we view the local lesion in this way, although we recognize the anterior existence of the general affection, which alone, to speak truly, constitutes the disease, we find the explanation of its most marked symptoms, the erysipelatous eruption, which, in the women submitted to our observation, had always for a starting point a slight solution of the continuity of the skin,” *M. Pihan-Dufeillay*.

Of late years there have been considerable thorough and careful researches as to “the infective product of all acute suppurative inflammations, as well as into the distinctive characters of the noxious or septic, and the innocuous, bacteria.” Dr. B. Sanderson, of London, England, in a communication to the Pathological Society of London, on pyemia, observes: “ I wish to show (1) that every pyemic abscess contains a poison, which, when introduced either into the circulation or into a serous cavity, produces the symptoms of pyemia; and (2) that we have this poison so entirely in our possession, and so far under our control, that beginning with an agent so mild in its action that it produces no marked symptoms, we can convert it into an agent of such intensity, that it kills in two or three hours, with the formidable symptoms seen in the case we have now before us.

“ This intensification is effected by a process which may be called cultivation. Dr. Klein made the important discovery, that, if a pyemic liquid were transferred to the peritoneum of a guinea-pig, and allowed to remain there for a couple of days, although it did not at first produce any intense symptoms in the animal itself, its toxic intensity increased in such a degree that, when the transudation-liquid

produced in this was injected into another animal, it had acquired the most deadly activity; and that all such extremely active liquids were crowded with bacteria of a peculiar character, the increased number of which seemed to be in proportion to their toxic properties.”*

Again, he replied to remarks, from some of the members of the society, concerning the presence of bacteria, etc.: “As regards bacteria in general, I am well aware from my own experiments, that the ordinary bacteria of putrefaction possess no toxic action, and that liquids containing them can be injected into the circulation of living animals without result. As regards the bacteria of pyemic products, I have carefully guarded against the inference that they were the efficient causes of pyemia. I regard them as only characteristic inhabitants of infective liquids, and therefore very probably carriers of infection. As regards the word septicemia, I consider it to mean a state of the blood which was only present in the most intense forms of pyemia, and I agree with Mr. Hulke in regarding metastatic abscesses as an accident, rather than as an essential of pyemic infection.”

The malady occurs more frequently, and with greater malignancy in cold seasons, and during damp, or moist conditions of the atmosphere, while in warm and dry seasons it is less common, and more favorable in its results.

Much has been said about the contagious, or non-contagious character of puerperal fever; some of our most eminent medical men maintaining that it is decidedly contagious, and others, equally as distinguished, supporting an opposite opinion. It is a very difficult matter to satisfactorily determine this question, because the extension of the disease, during its endemic existence, may be safely attributed to its endemic nature; while, on the other hand, instances have occurred which so strongly manifested a contagion, or an extension without endemic influences, that, to say the least, it would be exceedingly impolitic to make any positive declarations relative thereto. Perhaps, there may be some forms of this disease, as for instance the erysipelatous, which may be communicable, even when it occurs sporadically; while other spontaneous forms are, probably, never contagious; the subject requires still further investigation.

I can not, however, divest myself of the opinion, that it is a contagious disease, especially the typhoid and erysipelatous varieties; for,

* These microscopic animalcular or vegetable infusoria, have been observed by a number of observers in pyemic pus and blood, as *micrococci*; *bacterium termo*; *b. lincola*, *b. bacillus*; the latter three due to putrefaction.

notwithstanding the statements and reasonings of those eminent gentlemen who favor the side of non-contagion, I have witnessed so many instances in which its existence could be accounted for in no other way than by contagion, that other explanations than those I have met with will be required to change my views on this subject. Peritonitis, metritis, etc., may exist at the puerperal period, independent of any pyemic infection, and though they may be modified to a greater or less degree by the puerperal condition, it does not absolutely render them contagious; and where these forms of puerperal fever exist, it is possible the disease may be non-contagious. In the present unsettled condition of this question, whatever may be our opinions, I believe with Dr. R. Lee, "that it is our duty to act in all cases as if the contagious nature of the disease had been completely demonstrated." The accoucheur who is attending a case of puerperal fever, should, for a season, avoid waiting upon any parturient females; he should likewise forbid the presence of pregnant women within the apartment of his patient, as instances have occurred, where the only assignable cause for the attack, was the presence of the female, during pregnancy, in the room of a child-bed fever patient. It is likewise stated by some authors, that a similar exposure of the non-pregnant female, during the catamenial period, has occasioned fever of a somewhat similar character.

As to the contagious nature of fevers during the puerperal period, Prof. Leishman calls attention to cases cited by Dr. Tyler Smith, viz.: "Two medical men, brothers and partners, attended, in the space of five months, twenty cases of midwifery. Of these, fourteen were affected with puerperal fever, a fatal result ensuing in eight cases. The only other known death from puerperal fever in the same town, within the period named, occurred in the case of a patient attended by a medical man who had assisted at the *post-mortem* of one of these puerperal patients. After this disastrous period the two brothers relinquished all their midwifery engagements for one month, in which time five of their cases were attended by other practitioners, and no instance of fever occurred in the course of that month. They then returned, and several fatal cases again happened. * * * Mr. Robertson, of Manchester, relates, perhaps, one of the most cogent instances of contagion and fatality on record. In the space of one calendar month, a certain midwife attended twenty cases belonging to a lying-in charity; of these, sixteen had puerperal fever, and all died. The other midwives of the same charity, working in the same district, attended, in

the same time, 380 cases, none of whom were affected with puerperal fever. In another large town, containing many thousands of inhabitants and numerous medical men, fifty-three cases of puerperal fever occurred. Of these, no less than forty happened in the practice of one medical man and his assistant." Many other instances, in support of the contagious character of this fever, might be given; the above, however, are deemed sufficient.

The several varieties of puerperal fever, classified according to the pathological conditions which are present, may be described as follows:

1. *Peritonitis*, or inflammation of the uterine peritoneum, and peritoneal sac.
2. *Inflammation of the uterine appendages*, as the ovaries, Fallopian tubes, and ligaments.
3. *Metritis*, or inflammation of the mucous, and muscular, or proper tissue of the uterus.
4. *Uterine phlebitis*, or inflammation and suppuration of the veins of the uterine organs.
5. *Inflammation of the uterine absorbents*.
6. *No primary inflammation*, but severe symptoms of a malignant typhoid nature, undoubtedly due to absorption of putrid material.

I. PERITONITIS, of the lying-in female, is usually, but not always, ushered in with rigors, more or less severe in their character, and which are preceded, accompanied, or followed by uterine tenderness, or pain. The rigors may be very slight, scarcely perceived by the patient, or they may be very violent, resembling an attack of intermittent fever, with coldness of the extremities. The pain, however slight it may have been at first, gradually increases in severity, at the same time extending itself over the abdomen. In the early part of the disease it may be mistaken for after-pains, but may be determined from them, by making pressure, during the intervals, over the iliac and hypogastric regions—if no pain or soreness is produced, there is no peritonitis. But if the pain has obstinately persisted for several days, with symptoms of constitutional disturbance, there will be strong reasons for suspecting a lurking inflammation. Commonly, when pressure is made over the regions just named, the patient being attacked with peritonitis, will complain of pain. Cases, however, are recorded in which the most severe form of puerperal peritonitis existed, without any tenderness or pain in the abdominal region.

The rigors pass away after a short period, and are followed by febrile symptoms, as flushed face, great heat of the surface, thirst, sometimes nausea and vomiting, short and hurried respiration, and an intense pain across the forehead. The pulse, during the rigor, is usually full, strong, and accelerated, beating from 110 to 140 in a minute; but as the disease progresses, it loses its hardness and volume, and becomes more frequent, small, and wiry, beating from 130 to 160 and upward in a minute; and in all cases when the pulse of a puerperal female remains persistently above 100 beats in a minute, it is good evidence of the existence of some abnormal action. The tongue is usually covered with a thin, moist, white or cream-like film, but red at the edges; and sometimes the whitish film is absent, and the whole surface of the organ is red. As the disease progresses, the coating becomes yellowish or brown, and occasionally there will be a dryness of the tongue, with a brownish coat from the commencement. The lochial discharge may be completely suppressed, or only lessened in quantity, and occasionally it continues to flow as usual. The secretion of milk is most generally suspended, and the mammæ become flaccid. The urine is scanty, turbid, or high-colored, with more or less difficulty in voiding it. Obstinate constipation is generally present in the early part of the disease. The countenance of the patient is peculiar, after the disease has formed itself completely, presenting a ghastly, pallid, anxious, and suffering appearance, with a livid hue under the eyes. Sometimes a crimson patch will be observed on one or both cheeks, which is an unfavorable symptom.

At the onset of the disease the abdomen is generally soft and flaccid, but becomes swollen and tympanitic as the disease advances. From the commencement of the attack, any motion of the lower limbs will occasion more or less pain: when this is severe, the patient usually lies upon her back, with the knees drawn up to the abdomen; which posture she retains on account of the pain caused by extending them. The pain eventually becomes so intense that she is unable to bear the least pressure upon the abdomen; the bandage will have to be loosened or removed altogether, and frequently the hands will be employed in holding up the bedclothes to remove their weight from the suffering parts. The least motion, as turning on one side, coughing, etc., occasions great suffering, in consequence of which she lies remarkably still, manifesting her distress and uneasiness by screams and moans, by throwing her arms about, and occasionally turning her head from side to side. With the tympanitic condition of the abdomen the pain will become more aggravated, or it may entirely subside.

The patient will frequently be indifferent to the welfare of her infant, even refusing to give it suck.

As the inflammation extends throughout the abdominal organs the tympanitic condition of the abdomen increases; the vomiting, which was at first mucous or bilious matter, becomes green, brown, or blackish, like coffee-grounds; the evacuations become dark and fetid, or a diarrhea may be present, which is an unfavorable symptom; the skin becomes cold and clammy; the pain ceases, an evidence that effusion has taken place; if the diaphragmatic peritoneum has been involved in the inflammation, hiccough takes place. Generally, the female retains her senses until near the end of the disease, when low, muttering delirium ensues, with carphologia, or picking at the bed-clothes; the lips, hands, and feet become purple; the pulse gradually diminishes, ceasing at the wrist, elbows, and axillæ, when death speedily closes the scene.

All the symptoms named will not generally be found in any one case; perhaps the most uniform among them is the frequent pulse. This, together with rigors, pains, vomiting, and tympanitis, are more commonly observed.

DIAGNOSIS.—It is not a very easy matter to determine between the varieties of uterine inflammation, in puerperal fever, as the symptoms, in a great measure, bear some resemblance; nor, in a practical point of view, is it of much importance, as the treatment in each of them, whether existing singly or combined, will be nearly the same. Yet it will be proper, notwithstanding, to name some of the distinguishing marks between peritonitis and other disorders, for which it may sometimes be mistaken.

It may be determined from *hysteralgia*, or *after-pains*, by observing that in these there is but little tenderness on pressure during the absence of the pains; that the uterus perceptibly contracts and hardens when they are present, which is not the case with the peritonitic pain; and that the pains diminish from day to day, while that of peritonitis rapidly augments. The pulse is frequent, in puerperal fever, and but seldom so in *hysteralgia*; and when this is the case, unlike the pulse of peritonitis, it soon falls to a normal condition. In peritonitis, the disturbance to the general system increases every day, while in *hysteralgia* it gradually ceases.

Intestinal irritation, from depraved secretions or fecal accumulations, is frequently mistaken for puerperal fever. The difficulty generally attacks at a later period than peritonitis, and does not occasion so much constitutional disturbance. The pain in the abdomen is equally diffused, and does not spread from a focus; the uterus is not tender

nor enlarged; the abdomen is soft and puffy, not tympanitic, nor does pressure aggravate the pain to any extent, and the patient can more readily move in bed. In each there may be chills, heat of skin, headache, rapid pulse, loaded tongue, flatulence, nausea, vomiting, and diarrhea or constipation. Intestinal irritation is said to be frequently confounded with peritonitis, and has been supposed to be the reported "violent cases of peritonitis in which the patient dies between the stage of excitement and of effusion, and no effusion or signs of inflammation are found."

In *metritis* or *hysteritis*, but little pain is produced on pressing the abdominal parietes until the enlarged uterus is touched, while in peritonitis, the least degree of pressure on the abdomen causes severe pain. The other symptoms of metritis are less general than those of peritonitis.

POST-MORTEM APPEARANCES.—The peritoneum, especially that portion covering the uterus, is red, vascular, thickened, and sometimes softened, and is frequently covered with a layer of lymph, resembling a false membrane, which occasions adhesions between the omentum and intestines, and sometimes between the omentum and fundus uteri. The redness will be the more intense, and the thickening of the peritoneum the greater, in proportion to the duration of the pain and the severity of the disease. The omentum frequently exhibits marks of inflammation, being red and highly vascular; and this may be found without any evidences of inflammation of the peritoneum. The serous coverings of the several organs, in the cavity of the abdomen, may exhibit evidences of inflammatory action. A turbid, whey-colored, or red serum, with purulent or albuminous shreds floating in it, or a yellowish lymph, are effused, in greater or smaller quantity, into the peritoneal cavity, and sometimes blood will be found, alone, or mixed with the serous fluid. Pus is frequently found deposited behind and around the uterus, beneath its peritoneal covering, and at those points where the inflammation has appeared to be the most active.

II. INFLAMMATION OF THE UTERINE APPENDAGES, may exist in conjunction with inflammation of the peritoneal covering of the uterus, or it may occur entirely independent of it: more frequently, however, they are met with together, and when this happens, the symptoms common to peritonitis will be present, with the addition of those which belong to inflammation of the appendages.

When the serous membrane and proper tissue of the ligaments, Fallopian tubes and ovaries are attacked with inflammation, while the

peritoneal sac is but slightly affected, or not at all, the pain will be located principally in one of the iliac fossæ, extending from thence to the groins, anus, and down the thighs. On making pressure, the pain will be experienced in the lateral portions of the hypogastrium, and will be less intense than in general peritonitis. An examination per vaginam will find the upper part of this canal hot and painful. The constitutional symptoms are similar to those of peritonitis, as rigors, hot skin, thirst, headache, frequent pulse, etc. When the attack is severe, prostration takes place rapidly, and the disease may speedily prove fatal. Or, it may terminate in *resolution*, without injury to the organs; with obliteration of one or both of the Fallopian tubes; or with adhesions between the tubes and parts in proximity, or of portions of serous membrane, and which may subsequently prove injurious.

Or, it may terminate in *suppuration*, matter being formed in the ligament or ovaries, and escaping into the peritoneal sac; through the vaginal or rectal walls; or, through the walls of the abdomen in the neighborhood of Poupart's ligament.

POST-MORTEM APPEARANCES.—The surface of the Fallopian tubes, ovaries, and broad ligaments, are red and vascular, and are imbedded to a greater or less extent in pus or lymph. The fimbriated extremities of the tubes are of a deep-red color, and frequently softened, and diffused or circumscribed deposits of pus may be observed beneath their coverings, and in their cavities. Effusions of pus or serum may likewise be found between the folds of the broad ligaments, and small masses of pus will be met with, dispersed throughout the enlarged ovaries; or these organs may be converted into a cyst holding pus, which escapes through ulcerated openings. One or both of the ovaries may exhibit evidences of inflammatory action, their peritoneal coat being red, vascular, and imbedded in lymph. They may be greatly enlarged, swollen, red, and pulpy, or there may be no apparent change in their parenchymatous structure. On dividing the ovaries, a great augmentation of vascularity will be seen, with a softening, or complete disorganization of its proper tissue. Occasionally, there will be an effusion of blood into the Graafian vesicles, destroying their texture.

III. METRITIS, HYSTERITIS, or INFLAMMATION OF THE UTERUS, commences most commonly on the third or fourth day after delivery, usually, but not invariably, with rigors, followed by a hot and dry skin, thirst, headache, accelerated pulse, dry and

furred tongue, with pain and tenderness in the uterine region, though pressure upon the abdomen occasions no pain until the hard and enlarged uterus is reached. The abdomen, at first soft, becomes tympanitic, and if the proper remedies are withheld the inflammation may extend to the peritoneum, when the pain will spread over the abdomen, being attended with the symptoms peculiar to peritonitis. The lochial discharge may be diminished or suspended, and may remain unchanged, or become of a dark color, and very fetid. The secretion of milk is generally defective; the urine is scanty, occasioning much pain when voided. A vaginal examination will find the os uteri very hot and tender.

In the more severe attacks, the above symptoms will exist in an augmented degree, with a pale countenance expressive of pain and great anxiety. The skin frequently becomes cold, assuming a sallow or bluish tinge. The pulse becomes rapid and feeble; the respiration hurried and distressing, with excessive prostration of strength. The pulse is more feeble, and the patient becomes more speedily prostrated, than in peritonitis.

If the disease progresses without amelioration, the tongue becomes coated with a dark or brown fur; the teeth and lips covered with sordes; the extremities become cold, with cold and clammy perspiration; vomiting is most usually present and also an obstinate diarrhea, the strength fails rapidly, with coma, or low muttering delirium, subsultus tendinum, and death. Metritis may terminate in resolution, abscess, softening, or gangrene; the milder varieties in the first-named, and the more severe in one of the latter.

POST-MORTEM APPEARANCES.—The uterus will be found enlarged, and its substance soft and flabby, presenting a dark purple, grayish, or yellowish pulp, sometimes of a very offensive odor, and which may exist in patches, or occupy a large tract of the organ. The softening generally proceeds from the inner uterine surface, and extends through, involving the peritoneal covering. Frequently there will be extensive disorganization of the muscular tissue of the uterus, without any change in the character of the peritoneal coat. All parts of the uterus may be attacked by inflammation and softening, and, frequently, that portion to which the placenta was attached is alone found to be disorganized. Coagulable lymph forming false membranes, and mixed with blood, and lochia, are also found on the inner mucous membrane; and in a few instances, instead of a complete disorganization of the muscular tissue of the uterus, small abscesses containing pus have been found in this tissue.

The peritoneum, covering the inflamed part of the muscular coat of the uterus, very often presents evidences of inflammatory action; it may be red, yellow or livid, having a disposition of lymph on its surface, or without this, but so softened in its texture as to be readily torn.

IV. UTERINE PHLEBITIS, or inflammation of the veins of the uterus, may be produced by any of the causes that occasion the other forms of puerperal fever. The symptoms are similar to the preceding attacks, as rigors succeeded by hot skin, thirst, accelerated pulse headache, etc., together with pain in the uterine region, which is much increased on pressure, and a suppression of both the lochial discharge and the secretion of milk. Frequently a confusion of mind, or incoherency will be observed.

The disease progresses very rapidly, the symptoms augmenting in intensity; rigors will frequently be present, especially during the early part of the attack, succeeded by an increased heat of the surface, the tongue becomes dry and brown, with insatiable thirst, rapid, full pulse, hurried respiration, vomitings of a greenish fluid, tremors of the muscles of the face and extremities, excessive drowsiness, or violent delirium. The body becomes of a deep sallow color, and sometimes petechiæ, or vesicular eruptions will be seen on various parts of it. The abdomen is frequently swollen and tympanitic, and the tenderness in the uterine region is increased; occasionally, no pain is present.

Death may take place during the acute stage, or the patient may recover from the primary attack and have her life shortened by secondary affections of the other parts, as for instance: congestion of the vessels of the brain, and deposition of lymph or serum into the ventricles; arachnitis; softening of portions of the brain; or deposit of pus into the cerebral substance. Congestions of the lungs, or disorganization of their substance; pleuritis; effusions of serum or blood; gangrene, etc. Hypertrophy of the heart with softening, and occasionally depositions of lymph and serum in the pericardium. Inflammation and softening of the mucous coat of the stomach; effusions of reddish serum between its mucous and muscular tissues. Softening and perforation of portions of the intestines. Congestion, softening, or abscess of the liver, or of the spleen. Inflammation of the kidneys, with depositions of pus, softening, etc. Inflammation of the conjunctiva, with effusion of lymph in the anterior chamber, destroying sight. Inflammation of the joints, with abscess, and infiltration of a sero-sanguineous fluid into the muscles or cellular substance of the limbs.

presenting the appearance of erysipelas. Sometimes abscesses form discharging enormous quantities of pus, rapidly prostrating the patient.

DIAGNOSIS.—This is very difficult to distinguish from the preceding varieties, especially during its early stage. The pain and tenderness is more confined to one spot than in peritonitis, and when the disease has continued for some time, the secondary affections will manifest themselves.

POST-MORTEM APPEARANCES.—The uterine veins are found changed, having their coats thickened, and their canals frequently so closely contracted as to be almost, if not quite impervious; and their lining membrane will be pale and covered with lymph or pus, frequently it will be of a bright scarlet color. Similar conditions will be found when distant veins are involved, with a hardening of the surrounding cellular tissue, which contains depositions of pus. Most commonly the inflammation is confined to the veins of one side only, and which is the side corresponding with that of the placental attachment. Occasionally the veins will be plugged up with firm coagula, or other abnormal substances. Beside the uterine veins, the spermatic are more frequently affected—and the disease may extend rapidly to the hypogastric veins. The renal veins are generally involved, with a soft and vascular condition of the substance of the kidney.

V. INFLAMMATION OF THE UTERINE ABSORBENTS, or LYMPHATICS, presents all the symptoms common to uterine phlebitis, from which it is almost impossible to distinguish it. It is likewise followed by secondary affections similar to that disease.

POST-MORTEM APPEARANCES.—Pus is found at different points of the lymphatics, generally at nearly regular intervals, presenting a beaded appearance.

VI. NO PRIMARY INFLAMMATION, TRUE PUERPERAL SEPTICEMIA, or PYEMIA, in the more severe degrees of which the vital powers rapidly fail, and death occurs before inflammation has had an opportunity to manifest itself. It is ushered in, within a few days succeeding delivery, with violent rigors, or with a peculiar, chilly sensation, greatly increased temperature, varying from 100° to 108°, quick and small pulse, 96 to 150, and extreme depression of the vital powers; not unfrequently an offensive diarrhea will come on within from twelve to thirty-six hours from the commencement of the attack, and at a later period, say in from twenty-four to forty-eight hours, dyspnoea may appear, being due probably to the blood globules having lost the property of complete hematosi. The face

becomes pale with an expression of anxiety, and the features pinched and sunken; headache is frequent, with nervous prostration and mental indifference, the patient seldom complaining or even evincing an interest in her condition. The speech and movements of the patient are tremulous; the mind is clear during the day, but at night, there will often be observed a kind of subdelirium, however, without agitation. The breath is more or less fetid; the tongue dry and fuliginous: the skin becomes covered with a cold, clammy perspiration: the muscles flabby and enfeebled, with suppression of the lacteal secretion, as well as of the lochial flow. Sometimes, but not always, there are abdominal pains; more commonly tympanitis; and frequently vomiting of a greenish substance. The urine is scant, high colored, containing an excess of urates, and, frequently, albumen. The extremities and trunk become more or less covered with purplish spots. Prostration rapidly ensues, the mind begins to wander, with drowsiness, speedily followed by death on the third or fourth day from the first manifestations of illness.

All these symptoms are not invariably present, but will vary with different individuals, from a mild "milk fever," to one of the most malignant character. Chills are frequently absent in this form of the affection, as in the others; and even, pain, abdominal tenderness, or tympanitis, may not exist, even in those instances in which the septicemic form is associated with severe peritonitis. The malady may exist merely as a blood disease, or, it may be associated with, and modified by, the existence of one or more of the preceding named inflammatory lesions.

M. A. D'Espine, who has devoted considerable attention to this malady, gives the following conclusions:

"1. Puerperal septicemia is constituted by a series of symptoms more or less severe, according to the dose of septic material absorbed by wounds on the walls of the utero-vaginal canal.

"2. These symptoms present nothing that is special to the puerperal condition, and may be assimilated to those which are caused by septicemia in wounded subjects and in animals.

"3. The starting point is always in the uterus or vagina; all the causes which prevent cicatrization of the uterine wound and which favor the development of septic materials on its surface, are efficient causes of puerperal septicemia.

"4. The lymphatics are the habitual road of the absorption of the poison; lymphangitis is the usual but not a necessary indication of its passage.

"5. *Peritonitis* is an associated lesion due to the transmission of septic material by the uterine lymphatic vessels; it may be compared to the local inflammations which are developed around infected wounds.

"6. The effect of septic absorption on the organism is to determine congestions and inflammations in all organs, especially the lungs, kidneys, and intestines; subserous ecchymoses or interstitial apoplexies, internal or external inflammations localized by preference in serous membranes; *during life* this action is manifested by fever, diarrhea, pulmonary congestion, epistaxis, and often by temporary cutaneous eruptions.

"7. Purulent absorption and septic absorption may be confounded by the bedside.

"8. There is no such affection as milk fever; the fever of the first week is almost always a slight septicemia, due to an absorption of the lochia, by small wounds on the walls of the utero-vaginal canal. When the uterus does not contract, and the lochia remain fetid, this fever may persist for some weeks. In cases of this kind one may almost always find ulcers in the neck or vagina.

"9. These slight infections are often, but not always, accompanied by uterine angioleucitis and signs of mild perimetritis. When the infection is prolonged, it may lead to consumption and death (septic phthisis).

"10. Puerperal *pyemia* is a complication of septicemia, and almost always coincides with suppuration in the veins of the uterus.—This complication, which is relatively rare, is due in all probability to septic emboli. Visceral metastatic abscesses are tributary to this, whilst all inflammations of the cellular tissue and of the articulations are due to lymphatic infection, and are not embolic in their nature." *Archiv. Gén. de Médecine*, October, 1872.

POST-MORTEM APPEARANCES.—No peculiar anatomical lesions belong to this affection. They will vary from a scarcely noticeable softening of the lungs, liver, spleen, or kidneys, or a few weak adhesions, etc., probably resulting from the poisoned and innutritious condition of the blood, to the more severe and extensive pathological appearances heretofore referred to under the various inflammatory conditions with which it may be associated. The character of the post-mortem lesions being due to the degree and extent, of the blood-poisoning, the organs affected by it, and the degree and extent of the inflammatory lesions with which it may be associated. The lesion will often be found in the uterine veins, the mouths of which become

plugged up by little thrombi, the decomposition of which, during life, occasioned the constitutional disturbance. Again, these may be absent, but the uterus itself will be found in a state of gangrenous degeneration; or the pleural and pericardial cavities may contain purulent or sero-purulent deposits. The eyes of the patient have even suffered with pain, suppuration, and corneal rupture; and, when death has not taken place so rapidly as usual, secondary abscesses have been found in various parts of the body.

It must be borne in mind, however, that the lesions observed are not the original cause of the disease, but are the results of the poison occasioning it; and when this poisoning is intense, death may occur so suddenly that the pathological conditions, which have been supposed to constitute the disease, have not had time to develop themselves. Again, severe peritonitis, phlebitis, etc., may occur at the puerperal period, or previous to it, independent of any poisonous absorption, the symptoms being more or less modified by the condition of the puerperal patient.

PROGNOSIS.—These several varieties of puerperal fever may exist singly or combined, more frequently the latter; and as their symptoms so closely resemble each other, when combined it will be a difficult matter to positively distinguish between them, yet in a practical view, as before related, this is of minor importance, the treatment being the same.

The prognosis is always unfavorable, and especially when the disease occurs endemically. The most unfavorable symptoms are suppression of the lochia, tympanitis, delirium, vomiting of greenish, or "coffee-ground" substances; rapid prostration of the vital forces; very high pulse, or thready and fluttering; hiccough; diminished pain on pressure, with increased ability to move the legs, and a frequent, feeble pulse, evidencing that the inflammation has terminated in effusion; cold, clammy skin; diarrhea, or involuntary stools; and dilated pupils. The most fatal period is during the third or fourth day.

But if, with an ability of the patient to move herself in bed, we find the pulse to lessen in frequency, the skin to become cooler and softer, the thirst gradually diminishing, the tongue cleaning, the bowels being more easily acted upon, the clearness of the skin returning, and the patient more able to make a deep inspiration, and to obtain refreshing sleep, we may augur favorably. The ability to change position without much pain, is frequently one of the first symptoms of improvement. Yet, even with all these favorable indications, we must not

cease in our close attentions to the patient, for it has happened, that when there was every indication of a favorable result, and physicians and friends were congratulating each other relative thereto, that the symptoms have returned with increased severity, and the attack has terminated fatally.

TREATMENT.—It is seldom that puerperal fever has exactly the same features, each endemic presenting symptoms peculiar to itself. If we admit only the five varieties of the disease, as described above, and which may occur separately, or in various combinations with each other, we have, then, twenty-six different modes of manifestation, in which there will be a great diversity of symptoms, in number, character, and severity. But, when, as is frequently the case, it prevails simultaneously with malignant erysipelas, or blood-poisoning, we may then have an additional number of twenty-six, giving to us fifty-two different features which the disease may present; and, probably, this fact may lead us to suspect the reason why writers have given such varied descriptions of it, as having occurred under their respective observations.

However formidable a disease may at first appear, which is capable of presenting so great a number of differences in its features, yet, for practical purposes, they may be reduced to two conditions, viz.: that in which the *inflammatory symptoms* predominate, and that in which the *typhoid symptoms*, or, *symptoms of blood-poisoning* prevail. And the treatment must be governed by the presence of one or the other of these conditions. The most important object is, to eliminate from the system, or to neutralize the absorbed poison, as much as possible; to sustain the vital forces; and, in the inflammatory varieties, to overcome the congestion and inflammation of the parts attacked, and bring about resolution—for if the disease terminates in effusion, the woman almost certainly dies.

In the **INFLAMMATORY FORMS** of puerperal fever, agents to control the heart's action and lower the temperature, and thus subdue the local inflammation, should be at once administered. The bowels are usually constipated in the beginning, and the administration of such means as will properly overcome this condition should be thought of. Mild but efficient measures should always be selected. The compound powder of Jalap will answer in some cases; a teaspoonful of the compound dissolved in two tablespoonfuls of boiling water, sweetened, and taken as a dose, will usually give the desired effect. The Cascara Cordial is preferred by some physicians. All measures that occasion depression of the system should be avoided; under

some circumstances it will be better to use enemas, soliciting one evacuation daily in this way. The bed-pan should always be used, and the patient not allowed to either get up in bed, or out of it; indeed, it is much better for her to keep in the recumbent posture, and without elevating the head and shoulders by pillows.

It will not be necessary to wait for the catharsis, but endeavor to get the patient as soon as possible under the influence of such agents as may be specifically indicated. If much pain be present with the fever, Aconite and Macrotys should be thought of, administered in the usual small dose. The Sp. Tr. of Veratrum Viride is likewise very useful, and when the pulse is full and bounding, will be found superior to any other agent for controlling vascular excitement, reducing the pulse from 120 or 140 to 80 or 100; it may be administered in doses varying from one-half to one drop, repeated every hour or two, until it has produced the desired effect; after which it must be continued, if necessary, in such doses, and at such intervals, as may be required to keep the pulse reduced. It may be used either singly or in combination with other agents that may be called for.

With the high grade of inflammation, the indication for Gelsemium frequently stands out prominently, when it should be administered with the proper sedative, and will be found to answer a good purpose.

Phytolacca will be often called for in this disease also; it may be given in alternation with the Macrotys and sedative. It favors the return of the suppressed lochia, and decidedly beneficial results will usually be found to follow the administration of these agents, and in some cases no other treatment will be called for.

I frequently administer Chlorate of Potassium in puerperal fever, and with good results. It is indicated by the disagreeable smell of the discharges, and bad smelling breath. It can be used in conjunction with other agents, or may be given in from two to five-grain doses, singly, two or three times a day.

Equal parts of the tinctures of Digitalis and Stramonium, given in doses of five or ten drops, every hour or two, have frequently been of advantage in this disease, particularly when the attack was mild.

Fomentations applied over the abdomen, as hot as can be borne, will be found a powerful means for relieving the pain and soreness in that region when due to inflammatory action; they may be made of Hops and Tansy, or Hops and Poppy-heads, or either of these with Chamomile flowers, and they should be renewed frequently, not permitting them to remain on when cool, and the patient should not

be made uncomfortable by applying them so wet as to dampen the bed upon which she lies. For a fomentation to the bowels I know of no agent equal to the leaves of Stramonium, which are now being used in various inflammatory affections, by some of my colleagues, upon my recommendation, and with much success; I have used these when fresh, by bruising and warming them previous to their application, or, by steeping the dried leaves in boiling water, and frequently changing them upon the abdomen. I have persisted in the appliance of this remedy even after it has caused double vision and other symptoms of its peculiar narcotic influence upon the system, and *invariably* with benefit. It not only lessens pain, but actually assists in reducing the inflammatory action. When its effects upon the system are no longer desirable, one of the previously named fomentations may be substituted. The fomentations will prove beneficial only during the acute stage, and must be dispensed with when prostration ensues, or when the inflammation has been overcome. The addition of Oil of Turpentine to them, when tympanitis is present, has been found useful.

For a common drink the patient may take an infusion of Peach-leaves, which will occasion diuresis, and thus aid in lessening the severity of the attack; this may be drank freely, especially in the early part of the attack. A free action of the kidneys is always desirable in this malady, and should be kept up as much as possible, as it not only aids in allaying vascular excitement, but also affords a means of eliminating the absorbed poison from the blood. In the latter part of the disease, other remedies will be called for by the condition of the tongue. A good condition of the stomach is necessary, in all cases, for the reception and absorption of medicines, and assimilation of food.

The *dirty tongue* is a very common condition in this disease, as might be expected from the poisoned state of the blood following the absorption of putrid material, together with the high fever, nausea and vomiting, and inability to take food. Sulphite of Soda should here be given; a teaspoonful every two hours of a solution of $\mathfrak{z}\text{i}$ to Water $\mathfrak{z}\text{iv}$, and continued until the tongue cleans and the patient no longer complains of a bad taste.

Another case may present the *heavily coated tongue* at base, yellow appearance of the skin, fullness of the superficial veins. Here Podophyllin should be thought of; one grain triturated with one hundred grains of Sugar of Milk, and given in five-grain doses two or three times a day, usually answers a very good purpose.

The *broad and flabby tongue*, showing the imprint of the teeth on the sides, calls for Lobelia, which should be administered with the sedative, or such other agents as are being used.

The *elongated, red, and contracted tongue*, evidence of irritation, is an indication for Ipecac, and it should, as a rule, be administered with Aconite.

There are numerous other remedies that will be found valuable in this affection. We should have the case well in hand, carefully studying out the condition and symptoms present, supplying the remedies in each individual case according to the specific indications present. Rhus Tox, Bryonia, Dioscorea, Baptisia, Muriatic Acid, Sulphurous Acid, are all agents to be thought of in connection with puerperal fever, and should be given when indicated.

Rhus Tox, when the sharp pain in frontal region, burning pain over left orbit, sharp stroke of pulse, are prominent symptoms, will be the remedy. Dioscorea is especially useful in subduing the pain of puerperal peritonitis, and may be given with the sedative. When the tongue becomes coated dark, brown, or yellow, Muriatic Acid should be prescribed, using a few drops in a half-glass of water, enough to make it pleasantly acid, and allow the patient to take a teaspoonful every hour or two. Acidulous draughts are also desirable, as lemonade, tamarind-water, orange-juice, vinegar, and even tart cider, when there is prostration. If the patient during the early days of the fever desires ice, or iced water, they should not be withheld.

When the pain is very severe, and the inflammatory action intense, in addition to the above named measures counter-irritation will often be very useful; mustard, or very stimulating liniment, may be applied along the whole course of the spinal column, and to the legs and inside of the thighs. Some practitioners recommend the application of cups over the lumbo-sacral region, and even leeches over the abdomen; there may be cases in which some transient benefit will be derived from these, but I have never yet had occasion to employ them—still, I should not hesitate to do so, were it necessary. But general venesection, which was at one time so almost universally advised by writers, who placed their greatest reliance upon it, I am decidedly opposed to, and am induced, from the results of observation, to believe that, at least as frequently as the disease itself, it occasions fatal results.

Excessive nervousness or sleeplessness may be overcome by Sp. Tr. of Pulsatilla, Gelsemium; or by Hydrate of Chloral, Bromide of Potassium, etc.

After the more severe symptoms have been subdued, many practitioners discontinue the exhibition of the former internal measures, substituting for them the compound powder of Ipecacuanha and Opium, to be given in appropriate doses, and at intervals of two or three hours. The internal administration of Sulphate of Quinia will be useful in some cases, and under certain circumstances, periodicity being its principal indication; it may be used in two to five-grain doses, alternating with the compound powder just named, every two or three hours, and will be found very beneficial in favoring a rapid convalescence, as it checks the tendency to pus-formation, and increases nerve force. Any unpleasant symptoms occasioned by this agent may be removed by adding Bromide of Potassium to it, and which addition will likewise enable us to give the Quinia salt in much larger doses without the subsequent development of any disagreeable results. Others prefer the compound powder of Quinia. These preparations may likewise be used with advantage where typhoid symptoms are present.

Prof. King suggests that he has found the tincture of Gelsemium, either alone or in combination with the tincture of Aconite, sufficient to resolve the disease, in some cases, without the aid of other remedies; "though, when the attack is very severe," he remarks, "I have always found it more advantageous to cause free diaphoresis." Many others have found similar benefits from the continued use, as required, of Veratrum or Aconite with Macrotys.

It is highly important, in all the varieties of the disease under consideration, that all clots and remains of the lochia and other matters that may, from decomposition, form septic virus to be absorbed by exposed surfaces in the uterus or vaginal cavity, be carefully removed by injections or by swabbing out the utero-vaginal canal from time to time with some disinfecting fluid. This is one of the most essential features in the treatment, and for this purpose hot water should be used, to a pint of which about one drachm of Carbolic Acid has been added; I prefer, however, Borax or Chlorate of Potassium, or, in some cases, Asepsin, to Carbolic Acid; or a weak solution of Permanganate of Potash may be used, or any of the alkaline sulphites or sulpho-carbolites. An infusion of Golden Seal and Wild Indigo bark of root has also been advantageously employed. These injections or swabbings should be repeated several times a day, being careful, when the uterine cavity is injected, not to pass the fluid too forcibly into it, nor in too large a quantity at a time; say from two to four fluid

drachms at a time, and repeated at intervals of four or five hours. Sometimes benefit will follow injections of warm water into the uterus; from half a pint to a pint may be used at a time, and may be repeated every three, four or five hours. These swabbings and injections should always be given by the medical attendant—never by the nurse, unless she be trained, and understands the importance of cleanliness in such cases; they cleanse the organ from all abnormal and putrefied matters, lessen the sufferings of the patient, and aid materially in restoring the parts to a healthy condition. Cleanliness of the bed and of the utero-vaginal canal, pure or disinfected air, and proper ventilation of the lying-in room, are highly valuable hygienic auxiliaries in the treatment of this terrible malady.

In addition to the external application of Oil of Turpentine for the tympanitic condition of the abdomen, it will frequently become necessary to administer internal means; a mixture of equal parts of Castor Oil and Oil of Turpentine, may be given in fluidounce doses, and repeated every two or three hours, until gentle catharsis is induced. And when this is employed, other cathartics must be omitted. Though it must be recollected that cathartics are not always desirable when tympanitis is present, especially when they tend to depress, or when there is a disposition to diarrhea. Sometimes, Paregoric elixir may be advantageously added to the dose. Or, a combination of equal parts of Oil of Turpentine and Paregoric elixir, may be given in small and repeated doses, while other cathartics are being employed instead of Castor Oil. I have met with decided benefit from the use of a saturated tincture of Prickly-ash berries, as an injection into the rectum, and also administered internally. As an injection, it may be employed in half fluidounce, or fluidounce doses, very slightly diluted with water, and repeated every half-hour or hour. When there is much pain, half a fluidrachm of Laudanum may be added to each injection. In some instances, I have beneficially combined it with Oil of Turpentine, with the compound tincture of Lobelia and Capsicum, and with these last-named two preparations together. Internally, it may be given alone in fluidrachm doses, or, combined with Oil of Turpentine and Paregoric elixir, equal parts of each, of which from half a fluidrachm to a fluidrachm, in some sweetened water, may be repeated every hour or two. The tincture of Prickly-ash *bark* will not exert the same influence upon tympanitis, as that of the berries, which appears to have almost a specific influence, and may be used *per rectum* at any period of the disease when tympanitis is present. Its use internally, or by mouth, must not be commenced until the higher inflammatory action has become somewhat lessened.

Vomiting is frequently very obstinate, resisting all measures for a length of time. Aconite and Ipecac in small doses, frequently repeated, will usually give desirable results. Gelsemium, alone or combined with some opiate, does well in some cases; or some aromatics may be used, as Peppermint-water, Anise-water, Spearmint-water, etc. Minute doses of Morphia and Bismuth may be used where other means fail. Frequently a Mustard poultice to the epigastric region will be of service in lessening the vomiting. Sometimes effervescent acidulous draughts will be useful, as Soda or Seidlitz-water, with Lemon-juice and a few drops of Laudanum. And when these do not cause it to yield, it will diminish with the abatement of the inflammation.

In the TYPHOID or MALIGNANT FORM of puerperal fever, the course of management for the first day or two, during the more active stage of the disease, may be the same as in the preceding form, but afterward it will require considerable change; and the means which I am about to advise for the purpose of combating the typhoid symptoms, may also be employed when symptoms of a similar character are present in the depressing stage following the inflammatory.

As soon as it becomes evident that the disease is assuming the typhoid form, antiseptics should be administered, choosing from that class of remedies such agents as are specifically indicated by the symptoms present in each case. Among the different remedies to be considered are Sulphite of Soda, Chlorate of Potassium, Muriatic Acid, Baptisia, Sulphurous Acid. The surface should be occasionally bathed with an alkaline bath, rendered somewhat stimulating by the addition of spirits or alcohol.

The poisonous condition of the blood, in this disease, will be frequently manifested by the pallid, dirty tongue, often pasty and sticky, a disagreeable taste, and frequently loss of appetite; such are the indications for *Sulphite of Soda*, a remedy very often indicated when the typhoid symptoms appear, and if given early will often modify the severity of the attack.

The indication for *Chlorate of Potash* is manifested by the putrefactive odor present with the suppression of the lochial discharge, the unpleasant odor of decomposition, together with bad smelling breath. Chlorate of Potash zii , Water ziv , in teaspoonful doses every two or three hours.

Muriatic Acid is called for where the tongue shows the *brown coating*, peculiar to the typhoid state.

Sulphurous Acid is the agent when the dirty coat of the tongue shows sepsis. It is a very mild acid.

The indication for *Baptisia* is given by Prof. Scudder as follows: "It is not so easy to see the exact indications for *Baptisia*, yet it is one of our very best remedies, if the diagnosis is rightly made. There is a dull red coloration of skin where it has a free circulation, of the lips, and of the tongue and fauces; or, as we sometimes say, there is an *off-color* of the tongue—livid, purplish, dull red. In the advanced stage of the disease (puerperal fever), the tongue is protruded with difficulty, is stiff, fissured, and bleeds, and the tissues of the mouth and fauces look full and lifeless. The pulse is oppressed, and the skin is dry, husky and lifeless. The excretions are frequently fetid. I prescribe: R. Tinct. *Baptisia* gtts.; Water \mathfrak{z} iv; a teaspoonful every two hours, usually alternated with the proper sedative."

The pain and tympanitic condition of the abdomen must be treated as already described.

As soon as the patient desires acidulous draughts, permit them to be taken, not forgetting that when the tongue is furred dark-brown, or yellow, good tart Cider is not only refreshing, but is powerfully sanative in its effects.

When the prostration is excessive, Sherry, or sparkling Catawba wine, porter, good French brandy, etc., must be freely given to support the system until reaction comes on; together with a light, nutritious, easily digestible diet, as, solution of gelatin, of gum arabic, etc. The vital powers must be sustained by every means possible.

An equilibrium of the temperature of the surface must be maintained by cooling lotions to the head, and warmth and stimulants to the extremities. In some cases, where the prostration was excessive, I have applied cold to the head, with sinapisms around the legs from the hips down to the feet, and around these placed heated rocks, or bottles of heated water, and with marked advantage. It may frequently become necessary to cut the hair close, when there is much disturbance of the brain, before applying the cooling lotions.

When diarrhea is present, I know of no better agent than the Liquor Bismuth, in half to teaspoonful doses. Some physicians always make use of tincture of Chloride of Iron, either with or without some preparation of Opium. It may be given in doses of ten or twenty drops, repeated every hour, in a sufficient quantity of water, and at the same time, in severe cases, an injection, after each diarrheal evacuation, should be given, composed of Tannic Acid, ten grains; Glycerine and Water, of each one fluid ounce; mix. This should

be retained by the patient as long as possible. The tincture of Chloride of Iron has a powerful and beneficial influence on the capillary vessels, and it will not only be found valuable in the diarrhea attending this malady, but also in those cases complicated with erysipelatous indications. Tannate of Quinia has also been highly recommended when diarrhea exists. Whenever I have good reasons for knowing that an erysipelatous condition is connected with the puerperal fever, as soon as the more active symptoms have been somewhat diminished, I administer fifteen or twenty drops of the tincture of Chloride of Iron in a proper amount of water, repeating it every hour, until the symptoms have yielded, *and in no instance* has its exhibition been otherwise than beneficial. In many instances I have, from the commencement of the attack, administered the tincture of Veratrum, and the tincture of Chloride of Iron, alternately, every half hour or hour, and with the most happy results. But should I meet with a patient in whom it increased the symptoms, of course, I should cease or suspend its use. May not the erysipelatous and typhoid characters of this affection frequently be owing to absorption of putrid matter, as decomposition of coagula within the uterine cavity, or of remaining pieces of placenta or membranes?

In the early stage of puerperal fever the diet must be light and cooling, but more nourishing in the latter stages, as gruel, panada, toast, bread-water, rice-water, barley-water, apple-sauce, prune-water, tamarind-water, etc. And after the danger has passed, the patient remaining much debilitated, chicken-broth, beef-tea, veal-tea, etc., with or without Sherry or other wine, brandy, etc., as the case may require, may be allowed, increasing the nutritious character of the diet gradually, as she continues to improve.

It would be impossible to lay down specific rules for the guidance of the practitioner in treating the various forms under which puerperal fever may individually appear. The above general principles of treatment will be found the most successful, although it may require to be modified, or pursued more or less energetically, according to the phenomena which are present. Other means have been advised, some of which are undoubtedly valuable, yet I have considered it the better course to name only those principles of treatment, in this malady, which I have found successful in my own experience. And in closing upon this subject, I would remind the student that not only must he carefully and attentively watch his patients who labor under childbed fever, but he must also use every means to avoid propagating the disease, the same as if its contagious nature were satisfactorily demonstrated.

Frequently, the disease may be prevented by an early attention to the bowels and kidneys—evacuating them by the proper agents; keeping the utero-vaginal canal in a cleanly condition; maintaining a slight determination to the surface by some diaphoretic powder, applying a fomentation to the abdomen when the pains are of a suspicious character, and avoiding exposures to cold, and damp or moist atmosphere. It is sometimes the case that the patient does not promptly recover from the effects of parturition, but keeps her bed for several days more than usual, owing to a sense of general debility; the milk is not secreted freely; the pulse is corded or wiry, somewhat bounding, and rather more frequent than natural; and there is slight pain or tenderness when deep pressure is made in the hypogastric region. A slight elevation of temperature is likewise generally present. In such instances there is danger of an attack of this affection; and I have found prompt relief to follow the administration, every one, two, or three hours, as the severity of these symptoms would indicate, of a powder composed of Prussiate of Iron, two and a half grains; Sulphate of Quinia, two grains; Piperin, one grain.

CHAPTER XLIX.

PHLEGMASIA DOLENS—CRURAL PHLEBITIS—TREATMENT OF PHLEGMASIA DOLENS.

PHLEGMASIA DOLENS, is the name applied to a swelling of one or both legs which occurs soon after delivery, and is accompanied with pain and tenderness. The disease has been termed *milk-leg*, from a mistaken idea that it was owing to a metastasis of milk from the breasts to the legs. It has also received several other names, according to the views of writers, thus, *œdema dolens*, *œdema lacteum*, *phlegmasia alba dolens puerperarum*, *metastasis lactis*, *depôt du lait*, and *crural phlebitis*. It may attack primiparæ but is more frequently met with among multiparæ.

Although this disease has been known to the profession for a long time, yet its nature has not been satisfactorily understood, and, even at this time, there are conflicting opinions regarding it. Mr. White, of Manchester, in 1784, considered it to be caused by an obstruction, or some morbid condition of the lymphatic vessels and glands of the

parts attacked. Mr. Trye, in 1792, supposed it to depend upon a rupture of the lymphatics, as they cross the pelvic brim. Dr. Ferrier attributed it to inflammation of the absorbents. Dr. Hull, in 1800, considered it to be an inflammatory disease, producing a sudden effusion of serum and lymph. In 1817, Dr. Davis made an autopsy, and found evidences of extensive inflammation of the veins. In 1823, M. Bouillaud, supposed it to be owing to obstruction of the crural veins, having found these veins obliterated in several females who had labored under the disease. In 1829, Dr. Robert Lee succeeded in tracing the inflammation into the uterine branches of the hypogastric veins, and he gave it the name of *Crural Phlebitis*.

A commonly received opinion, but a few years since, and which was based upon post-mortem appearances, was that the immediate cause of phlegmasia dolens, is inflammation with more or less obstruction of the crural veins, the inflammation, in many instances, extending from the uterine veins, being seated principally in the cellular and middle tunics of the veins.

Dr. Mackenzie, from the results of a series of experiments, is of the opinion that phlegmasia dolens is owing to a vitiated condition of the blood, and that the venous inflammation is rather an effect of the original disease. He states that all the phenomena of the affection will not be produced by inflammation of the iliac or femoral veins only; that, during health, a mere local cause, as inflammation, or an injury, does not produce the extensive venous obstruction which is found in phlegmasia dolens; that, independently of inflammation or local injury, an obstruction of the veins may be produced by an irritation of their lining membrane, and will be more or less extensive according to the degree of irritation; and, that we are rather to look upon a morbid condition of the blood as the source of this irritation, instead of local injury, inflammation, or disease of the veins.

These views of Dr. Mackenzie appear to be confirmed by the fact, that, phlegmasia dolens has been known to exist when the uterus was in a normal state, and also, when the vessels of the thigh manifested no indications of disease, this being confined to the leg only; again, females suffering under carcinomatous, rheumatic, gouty, and other diseases, seem to be more liable to the puerperal swelled leg than others. Yet, it has occurred among those who were apparently free from any disease up to the time of the attack. Further investigations will be required before a correct and satisfactory theory of the malady can be determined. My own view is, that the disease is primarily an affection of the lymphatics, and that the venous inflammation is merely

a secondary result of the original malady. Perhaps, there may exist a previous vitiated condition of the blood, rendering the female more readily susceptible to an attack, or, what is still more probable, the blood may be gradually poisoned by absorption of putrid material, and the septicemic action being (very likely from embolism) limited or confined within a certain sphere, the disease under consideration becomes developed instead of puerperal septicemia; and some cases have occurred under my notice which would favor such an idea, yet, at present, I am not prepared to make any positive statements relative thereto. A physician has observed to me, in a communication: "From careful and oft-repeated observations as to the nature and seat of phlegmasia dolens, I have become confirmed in the opinion, that it is primarily and essentially a disease of the lymphatic glands, and subsequently of the lymphatic vessels of the leg, the inflammation of which extends to the veins, and to the whole limb.

"This derangement of the lymphatic glands, I believe to be caused by the pressure of the head of the fetus in passing through the superior strait, and the reason why the *left* leg is more frequently the seat of the disease than the right, is owing to the fact that the occiput of the child is more generally directed to the *left side* of the pelvis. At the lower part of the superior, and the upper part of the inferior strait, there are many lymphatic glands which are large enough to be much more prominent than the nerves or veins; and they *must* oftentimes become compressed by the occiput of the child during its passage. This pressure may cause the glands to become inflamed and engorged, and the engorgement will cause an obliteration of the vessels, or, at least, an obstruction to the free flow of lymph through them, which obstruction will lead to congestion and inflammation of the inguinal glands, and gradually to the lymphatics of the entire lower extremity.

"Among the phenomena on which I base this opinion, are, briefly, the following:

"1. The limb does not become seriously implicated for some little time after confinement.

"2. The lymphatic glands of the groin, and the lymphatic vessels of the limb are involved for some time before the nerves or veins appear to be affected; as evidenced by the locality and character of the swelling in every case examined; and also by the exudation of lymph whenever scarification has been employed.

"3. The general lymphatic engorgement of the whole limb, and the *cold, white* appearance of the part, contra-indicate inflammation of the veins, or of any other tissue except the lymphatics.

“4. The invasion of exactly the same form of disease in the arm of one man after amputation, where the lymphatic glands of the axilla had become involved, and the lymphatic vessels of the whole arm had become engorged; and, also, the appearance of two other cases of phlegmasia in the legs of men where *certainly* the lymphatics were first involved. Writers have also observed the same phenomena among males.

“5. The veins can not, in my opinion, be the primary seat of the disease, for they do not appear to be affected until after the disease has existed some days, and, in a few instances, even for weeks, after the affection of the lymphatics.

“6. The veins, when inflamed, do not present the same phenomena in any other part of the system as are observed in phlegmasia dolens, as, effusion of lymph, a white, shining surface, and a low grade of temperature.

“7. The treatment which is found the most successful in cutting short the disease in its earlier stages, is not such as would be demanded if the veins or nerves were primarily affected, but, *is such* as would be used for inflammation of the lymphatic glands, and vessels elsewhere.” Although I do not wholly participate in these views, I give them on account of the description of the phenomena attending the disease.

Phlegmasia dolens, although more commonly met with among puerperal females, is by no means confined to them; it has been observed among those whose menstrual discharge has been suddenly suspended; or who have had diseases of the uterine organs, as malignant ulceration of the cervix, polypus, etc. Nor do males appear to be exempt from it, for it has been known to occur in them, following dysentery, diarrhea with ulcerated intestines, cancer of the rectum, external injuries, amputation of a limb, etc. A similar affection has likewise been observed to attack the arms in both males and females, after some injury of the upper part of the body, or, during some carcinomatous disease of the breast. In any one of the above mentioned diseases or conditions, will be observed the possibility of decomposition and formation of septic material that may be absorbed into the system.

Various exciting causes have been named, the most common among which is cold; it is said also to be excited by pressure upon the pelvic veins and nerves, uterine disease, suppurative inflammation of the pubes, injuries, inflammation of the sciatic and obturator nerves, and sometimes to occur as a sequel of fever.

SYMPTOMS.—This disease most commonly appears between the tenth and fifteenth day after delivery; though it has been met with as early as on the fourth day, and again at a later period, even after the third week. It is generally preceded by pains or uneasiness in the lower part of the abdomen, with symptoms of uterine or venous inflammation, and a feeble, depressed, or irritable condition of the patient; frequently the patient is suddenly attacked without any premonitory symptoms.

It usually manifests itself with severe rigors, followed by an increased temperature of the surface, and by a sudden and deep-seated pain in the groin, or thigh. After a few hours the affected limb commences swelling, and usually upon its inner and anterior surface. In the greater number of cases, this swelling is first observed in the calf, sometimes extending to the inside of the heel, from whence it travels rapidly upward; occasionally, it extends from the thigh downward. Not unfrequently, before any pain in the thigh or groin is experienced, the calf of the leg will be found swollen, painful, and hard, as if it were attached to the bone, and can not be shaken, while the calf of the other limb, on being shaken, will be found flabby and movable. It is not unusual for the buttock, and labium pudendi of the diseased side, to share in the abnormal action.

The swelling is hard and elastic, the skin is tense, shining, white, and exceedingly sensitive to the touch, with an augmented temperature, and although yielding to pressure, does not leave a pit, except upon the parts which are free from pain, or at the decline of the disease. In the direction of the femoral vein, a hard, exceedingly painful cord may be felt, which is the thickened and indurated vein; sometimes, an enlargement of the inguinal glands may be detected. If the limb be punctured, only a few drops of a gelatinous fluid will be discharged. As the swelling progresses, there is, generally, some abatement of the pain, but not an entire removal.

The pain accompanying the swelling is very severe, and is much aggravated by any motion of the limb, or even by the slightest pressure. It is usually more intense on the inside and back of the thigh, in the direction of the internal cutaneous, and crural nerve. Sometimes it commences in the back and-hip-joint. It is constant, though there may occasionally be slight remissions; and the best position in which the limb can be placed is to have it slightly elevated upon an inclined plane, having an angle of from 6° to 10° ; or, it may be flexed both at the knee and hip-joints. In a depressed or depending position, the pain will be much augmented. From the commencement of the

attack, the affected limb feels heavy and stiff, and, as the disease progresses, the patient will be unable to move it, not only from the excessive pain produced, but, because the limb has become powerless.

In connection with the pain and swelling, there will be more or less fever, headache, nausea, or vomiting, quick and feeble pulse, giving frequently 130 to 140 beats in a minute; thirst, restlessness, and sleeplessness. The bowels are usually constipated; the urine turbid, and small in quantity; the lochia are suppressed, or fetid, sometimes the discharge remains unaltered; together with other symptoms, varying in degree, but indicative of the general disturbance to the constitution. These disappear gradually as the pain diminishes, leaving the patient extremely debilitated. Sometimes, there will be a copious perspiration throughout the whole course of the disease, which will debilitate the patient very much.

It is very seldom that phlegmasia dolens attacks both limbs at once; though it may happen, that when the pain and swelling of the limb first attacked subsides, the disease will manifest itself in the other one. It usually lasts from four to six or seven weeks, though the acute stage may continue for only ten or fifteen days. It may *terminate* in resolution, the swelling disappearing, and perfect use of the limb being restored; or, the swelling may take place slowly, the female not wholly recovering the use of the affected limbs. Suppuration, with ulceration, occasionally occurs, the consequent exhaustion eventually destroying the woman. And sometimes, death occurs either suddenly, as for instance, when the patient raises herself in the bed, or it may take place gradually from the secondary affections induced. Most generally, the acute symptoms are followed by a chronic form, in which the limb never returns to its original size, and remains almost powerless through life.

DIAGNOSIS.—This affection may be known, by its occurring within a few days or weeks after delivery; by the pain down the affected limb; by the hardness of the swelling; the attending fever; and the hard, cord-like, and painful condition of the femoral vein. If the calf of the leg is firm, hard, immovable, and painful on being compressed, and, if pain is produced in the upper part of the limb on rotating it, these are positive indications of crural phlebitis. The left side is more commonly attacked with the disease than the right.

PROGNOSIS.—The disease seldom proves fatal. The less severe the fever and the swelling, the milder will be the attack. When a favorable change is about to occur, the pain gradually diminishes, leaving a numbness of the leg for some time; the swelling softens and becomes œdematous, pitting upon pressure.

POST-MORTEM APPEARANCES.—The cellular membrane of the limb will be found distended with effused serum. The affected vein will be obliterated by adhering clots of blood, or coagulable lymph; its parietes thickened; its inner tunic of a deep color; and pus may be contained within its canal. Pus may likewise be found, together with evidences of inflammatory action, in the absorbents; small abscesses may be observed in the substance of the affected leg; and frequently, traces of secondary affections in the joints, cavities, etc., may be present.

The veins most commonly attacked, are the femoral, iliac, epigastric, spermatic, uterine, and vaginal, the saphena, and the vena cava.

TREATMENT.—During the acute stage, the indication is to eliminate or neutralize the absorbed poison, and to allay inflammatory action; and in the second or chronic stage, to promote absorption of effused fluid and restore the venous circulation.

To fulfill the first indication, both general and local measures will be required. Among the general measures, the first which demand our attention, provided there is no diarrhea, is the administration of a brisk cathartic, as, for instance, the compound powder of Jalap, with some Nitrate, or Bitartrate of Potassa added; or, the indication for Podophyllin may be present—the heavily coated tongue at base—when a few doses of the first or second decimal trituration may be given. The purgative should be administered in a dose sufficient to act thoroughly, without a repetition of it within four or five hours. It not only empties the intestinal tract, removing any existing morbid accumulations, but it likewise has a revulsive and eliminative effect, and renders the system more susceptible to the beneficial influences of subsequent medication. If necessary, the cathartic may be repeated again on the second or third day; and during the whole period of the acute stage the bowels must be kept free, causing one evacuation daily. In some cases *Nux Vomica* will answer a good purpose, especially where we have the sallow, expressionless face, more or less nausea, broad and flabby tongue; symptoms depending on a bad condition of the stomach.

After the catharsis, agents must be administered for the purpose of allaying the inflammation and lessening the pain. The proper sedative should be first selected, which will be *Veratrum* in most cases; to this will be added the indicated remedy. *Macrotys* will usually control the severe pain to a considerable degree. In some cases the remedy will be *Gelsemium*, or, when the pain is particularly of a burning nature, *Rhus Tox* should be thought of, and continued or

changed according to the degree of inflammatory action, and the influence of the remedy. Sometimes, and more especially when the pain is intense with high inflammation, the Sp. Tr. of Aconite may be added to the above compound, according to the influence it exerts upon the system. The above agent will most generally be found to act promptly in subduing the more active symptoms.

Other combinations, of equal value, may be used to fulfill the same indication; thus, the tincture of Gelsemium, administered either alone or in conjunction with the tincture of Aconite, will be found to exert a prompt and beneficial influence. Sp. Tr. of Iris has been used by many practitioners, and with excellent results. I have also derived great benefit, in two cases, from the internal administration of *Phytolacca*, assisted by its local application.

Occasionally, when there is no mitigation of the pain by the above means, the Sulphate or Acetate of Morphia may be prescribed in doses of one-fourth or one-half a grain, and repeated as may be required; this may be given more particularly when the patient is restless, irritable and sleepless. Chloral hydrate has likewise been highly recommended; also, subcutaneous injections of Sulphate of Morphia.

Salicylic Acid has been found useful in some cases, especially when there is lochial fetor, and severe pain. *Bryonia*, *Belladonna* and *Apocynum* are all valuable remedies, and should be administered according to the special indications calling for them. The same measures must be pursued as named in the treatment of puerperal septicemia, with regard to cleanliness, pure air, ventilation, oxygenation of the blood, and antiseptics, as well as to nervousness, sleeplessness, etc.

Gastralgia, or a burning pain in the epigastric region, is sometimes present, and may be relieved by the administration of a powder composed of Nitrate of Bismuth, ten grains; Lupulin, two or four grains; and this may be repeated every four or five hours. An infusion of Peach-leaves will also relieve it, as well as the tinctures of Gelsemium and Aconite, or, when these fail, *Nux Vomica*.

Among the local measures, fomentations to the affected limb occupy a prominent position. Vinegar in which Hops have been boiled, or an infusion of Water Pepper (*Polygonum punctatum*) may be applied to the whole limb by means of flannel cloths. Sometimes a warm application will be found the most advantageous, at others a cold one; this point must be determined, by the practitioner, according to the peculiarities of each individual case. Generally, cold applications

will be preferable, but when they occasion a sense of cold or chilliness, they are contra-indicated, and the warm applications must be substituted. Sometimes a bandage may be *loosely* applied along the whole limb from the toes to the groins, which should be kept constantly moistened with cold or warm water, or with a mixture of water and spirits; and frequently, a solution of Hydrochlorate of Ammonia will be found most valuable; be careful not to bandage tightly in the acute stage.

The affected limb must be handled most carefully, and be protected from pressure of the bed clothes, etc., when these occasion or increase the pain. A very excellent local application, when the skin is unbroken, is a mixture of saturated solution of Hydrochlorate of Ammonia, tincture of Arnica, tincture of Camphor, and Chloroform, equal parts of each; this should be frequently painted over the painful parts. Sometimes the pain and swelling have been greatly alleviated by hot Turpentine, applied to the whole limb by means of light cloths, repeating the application several times a day, twenty or thirty minutes each time. A solution of extract of Belladonna, frequently painted upon the limb along the painful part, has also been found of efficacy.

In the early part of the attack, much advantage may be derived from the application of cups or leeches on the limb, along the course of the pain, and many of our practitioners have beneficially employed these. I have always, heretofore, succeeded without them, but should not hesitate a moment to use them in any case where I considered it necessary.

But, of all the applications to the limb during the intensity of the attack, I know of none superior or equal to recent Stramonium leaves when these can be obtained. They should be bruised, and the whole limb covered with them. It is considerable trouble to collect and prepare the remedy in this manner, but a similar benefit, though in a minor degree, may be obtained by bruising the leaves, and placing them in hot, not boiling, water, and applying this infusion, either warm or cold, by means of flannel cloths. The application may also be extended across the hypogastric region with advantage. Dried Stramonium leaves do not exert the same prompt and decided influence over the inflammation, but their action may be improved by combining them with an equal quantity of Lobelia, and applying as above. The extract of Stramonium, or, of Belladonna, rendered thin, and applied on lint along the course of the pain, will frequently be of service.

Blisters applied more especially to the groin of the affected limb, or along the course of the pain, have been used with favorable results by many practitioners, though I have never found it necessary to employ them in my own practice. I have, however, frequently and beneficially applied a sinapism across the sacral and lumbo-sacral regions, and I prefer this to a blister on these points, on account of the decubitis being principally and for some time upon the back, or nearly so.

It should be stated that Sulphate of Iron, locally applied, aided by the internal administration of large doses of tincture of Chloride of Iron, has effected cures where other means had failed. From eighty to one hundred and twenty grains of the Iron Sulphate is dissolved in four fluidounces of water, and this solution must be applied on cotton, lint, or spongio-piline, to the affected limb, as hot as can be comfortably borne by the patient, repeating it frequently. These remedies, beside having an antiseptic property, possess likewise the power of controlling vascular dilatation.

The patient should be kept as quiet as possible during the inflammatory stage, the apartment should be kept at a moderate temperature, and she must be restricted to a low and cooling diet. After the removal of this stage, a more nourishing diet may be allowed, and should there be much debility, tonics, or wine may be judiciously administered.

After the inflammatory symptoms have been subdued, measures must be taken to promote absorption and restore venous circulation. Internally, Sp. Tr. Hamamelis and Collinsonia may be given, $\mathfrak{z}\text{i}$ to ii to $\mathfrak{z}\text{iv}$ of Water, and continued in teaspoonful doses for some time. In the advanced chronic stage alteratives must also be used, as, some preparation of Iodine, the compound syrup of Stillingia and Iodide of Potassium, or the compound syrup of Yellow Dock may be substituted. Hydrochlorate of Ammonia may be beneficially employed at this period of the disease; five or ten grains in solution, or syrup, may be administered every two or three hours; or it may be added to the above syrups instead of the Iodide of Potassium. The Sp. Tr. of Iris, in five-drop doses, answers a very good purpose also.

The limb should be carefully bandaged from the toes to the thigh, but not so tightly as to render the patient uncomfortable. As the bandage will require to be removed and reapplied twice in the course of every twenty-four hours, these periods may be improved for the purpose of applying friction, as well as some stimulating liniment or

wash, to the limb; and the bandage may even be kept moist with the same stimulant, or with a solution of Hydrochlorate of Ammonia, liniment of Iodine, etc. Currents of galvanism or electro-magnetism may likewise be passed through the limb once or twice daily, more especially in the advanced chronic stage. Of course, as in the acute stage, the limb should be kept in an elevated position, for such a length of time as may be deemed proper, in order to render the cure thorough and permanent. An irritating plaster over the sacrum, or, over the lumbo-sacral region, ought never to be omitted in the second stage—it tends greatly to facilitate the cure. The sore produced by it should be kept discharging as long as the patient can bear it. And after it has healed, if its further employment be indicated, do not hesitate to apply it. I know it is exceedingly painful and annoying, but its advantages, in this disease, repay its disadvantages a hundred times over.

Whenever the lochial discharge is fetid, whether in the first or second stage of the disease, hot water, in which has been dissolved Borax or Chlorate of Potash, in the proper proportion; diluted Pyroligneous Acid; Carbolic Acid, one part to one hundred of Water; or some other disinfecting liquid, may be injected into the vagina, two or three times a day. Cleanliness, etc., have already been referred to.

Any abscesses, or ulcers of the leg, caused by the disease, which may present themselves, are to be treated upon the same principles as other ulcers.

In this stage, the patient should be allowed to sit up more or less during the day, but never with the limb in a depending position; the diet should be nourishing and of easy digestion, and tonics, wine in moderate quantity, or wine and Peruvian bark, and even good brandy, must be allowed when there is much debility. In the more advanced stages of the disease, sea-bathing has been recommended, and may, probably, be occasionally useful.

The above treatment will, in the majority of instances, effect a perfect cure, if it be commenced sufficiently early, but the practitioner must not be disappointed in occasionally finding patients who, notwithstanding the active and energetic means employed, recover only to carry for the remainder of their existence, a debilitated and enlarged limb.

CHAPTER L.

PHRENITIS — PUERPERAL MANIA — TREATMENT OF PUERPERAL
MANIA—INTESTINAL IRRITATION—ACUTE
TYMPANITIS—DIARRHEA.

INFLAMMATION of the brain and its membranes is sometimes met with in puerperal females; there will be headache, flushing of the face, throbbing of the arteries, intolerance of light and sound, delirium, and all the symptoms of an ordinary phrenitis. The treatment will not vary from that usually pursued when the inflammation occurs at other periods.

It may be proper to observe here that, for five or six weeks after delivery, females are subject to severe cerebral derangement, from eating indigestible articles of diet, or from partaking too freely at meals. The most common symptoms in such cases are, headache, delirium, insensibility, convulsions, and death. They must be actively treated by the usual means for such disturbance, but it will frequently be found that treatment produces no amelioration of the symptoms, the disease steadily advancing toward a fatal termination.

PUERPERAL MANIA, is more frequently met with than puerperal phrenitis, and is said to occur more frequently among unmarried females than others. Those of an excitable or very sensitive disposition are the most liable to it, though no constitution or temperament is exempt. It may occur during gestation, during parturition, or subsequently; the most usual periods of attack are a few hours or days after labor, before the system has fully recovered from the shock; and, at some period previous to weaning, when the constitution is suffering from the debilitating influence of lactation. It may continue for a few days, or months, and frequently many years may intervene between the commencement of the attack and the mental restoration; occasionally the mania continues through life.

There is a species of delirium which is occasionally observed when the head of the child is passing through the os uteri, or when it is distending the perineum, and which is probably caused by the excessive pain experienced at these times. It is not permanent in its character, generally disappearing shortly after the passage of the child through

the parts. The female is frequently aware of the wildness and absurdities of her thoughts and expressions during this period, but this is not puerperal mania.

Puerperal insanity is frequently hereditary, all the females of a family, from generation to generation, being subject to more or less mental derangement at the parturient period; and when this is known to be the case with a pregnant female, the practitioner should endeavor to ward off an attack by proper treatment during the gestating months, I am not aware whether the use of Chloral Hydrate during the period of labor, or the production of anæsthesia by Chloroform, has, in these cases, prevented the maniacal attack, but, as it appears to me, they certainly deserve a trial. A common predisposing cause is the extreme susceptibility or excitability of the nervous system and brain to which pregnant females, as well as those who give suck, are subject, and which renders them exceedingly liable to morbid impressions.

Mental emotions, as a great anxiety relative to her condition, or a state of depression, or a severe fright occurring during pregnancy, may likewise predispose the female to an attack of mania; and a very common predisposing cause is stated to be derangement of the digestive functions. Profuse hemorrhage has also been considered a predisposing cause.

The exciting causes are many; as irritation of the breasts, uterine irritation, suppression of lochia, the vascular disturbance caused by labor, suckling, nervous shock of labor, cold, and frequently it occurs without any assignable cause.

SYMPTOMS.—These do not vary essentially from those which occur during the insanity of non-pregnant females, or of males. The attack may come on suddenly, or it may take place gradually, and is frequently preceded by more or less headache, nervous irritability, and sometimes derangements of the digestive organs. In one form of the malady, the female will be restless and sleepless, incessantly talking, and expressing herself in a wild, disconnected, and most absurd manner; in another form, she will be depressed and melancholy. Females have been known to escape the watchfulness of their attendants when attacked by puerperal mania, and roam for a great distance from home, even through snow and severe cold weather, and without any other result than a restoration to sanity; which, however, would probably have occurred independent of such exposure and exercise.

It would occupy more space than is necessary in the present work, to detail the various symptoms which may occur in this disease; suffice it to say, that though there may be some peculiarities attending it, yet

the general symptoms present the same features as those of the several varieties of insanity met with at other times.

There are two opposite conditions of the vascular system in this disease ; one is accompanied with more or less fever, a quick pulse ranging from 120 to 140 beats in a minute, headache, throbbing of the carotids, flushed face, intolerance of light, great mental excitement with incessant raving, it being almost impossible to restrain the patient. The tongue is usually coated with a slimy fur ; the urine is turbid and scanty ; the secretion of milk diminished, as well as its nutritive qualities ; the bowels constipated ; the lochia suppressed, or natural ; and often a peculiar and offensive odor emanates from the various excretions. If a disposition to commit violence is present, it is commonly directed against others, and not against herself.

In the other condition, the pulse is feeble and but slightly accelerated ; the temperature of the surface is natural or diminished ; there is but little or no headache ; the tongue is coated white ; the bowels are constipated ; the countenance is pale and sunken, but sometimes calm and tranquil, with a gradually progressing emaciation. In this condition the patient is usually in a depressed or melancholy state, and is frequently aware of her situation ; there is more or less mental apprehension, perhaps a religious mania, with great physical inactivity, and a strong tendency to commit suicide.

Puerperal mania may terminate in a few hours, the mind being perfectly restored ; or it may continue for months or years, with ultimate recovery ; or it may, as has been observed in a few cases, be permanent and incurable ; or it may terminate in death, especially in the raving variety, which is attended with quick pulse and febrile symptoms.

DIAGNOSIS.—Puerperal mania may be confounded with *phrenitis* ; but although the pulse be quick in mania, it is not so sharp and hard as in cerebral inflammations, nor is there such a high degree of the heat of the surface and of the febrile symptoms ; in *phrenitis* there is an intolerance of light and sound, which is seldom the case in mania : *phrenitis* is attended with fever, headache, and other inflammatory symptoms, for some time before delirium manifests itself, while in mania the incoherency exists from the commencement.

It may be determined from *congestive headache*, by observing that this does not commence with delirium : and from *delirium tremens*, by learning the history of the case, the previous habits of the patient, and by attending to the attack, which, in *delirium tremens*, is not sudden, and is attended with a cold, clammy skin, profuse sweats, tremors, and tremulousness of the tongue.

When a pregnant female is subject to "frequent hysterical attacks; unaccountable exuberance or depression of spirits; morbid aptitude to exaggerate every trivial occurrence and attach to it great importance; suspicion; irritability; or febrile excitation; or, what is still more indicative, a soporose state, with very quick pulse, then," says Burrows, "the supervention of delirium on labor must be dreaded." And to these symptoms Ramsbotham adds, as a prominent forewarning, a great loss of memory.

PROGNOSIS.—The more serious form of puerperal mania, is that which is manifested by a greater or less degree of excitement. When it occurs immediately after delivery, with *constant* and *rapid* pulse, the paroxysms being furious and ungovernable, it is much more dangerous to life than when it occurs later, and with milder symptoms. Free evacuations from the bowels are favorable, as are likewise a decrease of the pulse, the patient obtaining some sleep, and not being much prostrated. A rapid pulse, increasing in frequency, is generally indicative of a fatal result, the mania being probably connected with an inflammatory action of some of the pelvic or abdominal viscera. The melancholy form of puerperal mania is more permanent, and more difficult of removal, than the raving. "Mania is more dangerous to life—melancholia to reason." (*Gooch.*)

TREATMENT.—To have the patient placed in a hospital is, very frequently, as the rule, the best and only course to pursue; yet, from its after effects upon the minds of the patient and her friends, there will always remain a dread of a second attack of insanity; to avoid which, it is, in every instance, better to attempt her cure at home, advising the hospital only as a *dernier ressort*.—We must attend to the symptoms as they manifest themselves, endeavoring to overcome the excitable condition of the brain and nervous system, without occasioning or allowing any great amount of debility to ensue. The bowels must be opened occasionally by some mild, stimulating purgative, and kept free, during the intervals, by gentle laxatives. The compound powder of Jalap will answer as a purgative. As a laxative, the powder of Rhubarb and Bicarbonate of Potassa may be used, or the compound syrup of Rhubarb and Potassa. If the patient can not be persuaded to take these, stimulating enema may be used, as Castor Oil, with the compound tincture of Lobelia and Capsicum added.

Frequently an emetic is indicated at the commencement of the attack, the administration of which has frequently produced results of a decidedly beneficial character; but it must be recollected that

they are injurious when there is prostration of the system, with a feeble, rapid pulse, pale face, and cold surface.

Counter-irritation will be found of great value. The whole surface should be bathed with a warm alkaline solution to which some alcohol has been added, after which a sinapism may be applied the whole length of the spinal column, together with friction and stimulating applications to the inferior extremities from the hips downward. In connection with this, the application of tepid or cold water to the head three or four times a day, as a douche, will prove beneficial; or cold applications may be constantly kept on the head. When there is much activity of the circulation, with preternatural heat of the head, the hair should be cut off, and sometimes leeches or cups to the temples and nape of the neck will be advantageous. The sinapisms may be changed alternately from the spinal column to the extremities, and *vice versa*, removing them when considerable redness of the surface to which they have been applied is produced, or when they appear to augment the disease. An irritating plaster, as, for instance, the Cantharideal Collodion dropped on adhesive plaster, may sometimes be advantageously applied to the nape of the neck or between the shoulders. This will be more serviceable in the melancholic form of insanity.

After the bowels have been evacuated, sedatives should be exhibited. The tincture of Gelsemium will be found exceedingly valuable; it may be used alone, or in combination with such other agents as are indicated in each case. In some cases one of the most prominent symptoms will be drowsiness or stupor, or a capillary congestion. Belladonna will be the indicated remedy, under such circumstances, and should be continued, in the usual small dose, as long as necessary. The tincture of Stramonium, or of Hyoscyamus, may be substituted, in some cases, for that of the Belladonna. Other agents may also be employed with benefit, as, a powder composed of Sulphate of Quinia, one grain; Sulphate of Morphia, half a grain; extract of Belladonna (dried), one-eighth of a grain; mix for a dose, which may be repeated every hour. Sleep and quiet are the patient's great restoratives; and every justifiable means should be adopted to procure sleep. Hydrate of Chloral has proved a safe and highly efficacious agent. Chloroform, Indian Hemp, Bromide of Potassium in twenty-grain doses, and medicinal Hydrocyanic Acid, have likewise been serviceable in certain cases. In some cases, subcutaneous injections of Morphia will promptly induce sleep. If she be boisterous, struggling against the

attempts made to induce sleep, she should be fastened in such a way as to keep her in bed, and prevent her from exhausting herself by her struggles. As with the preceding puerperal maladies, cleanliness will be of great value; especially the removal of offensive and putrid material from the utero-vaginal canal by injections of some disinfecting fluid.

The patient should be kept in a darkened room, free from noise or disturbance, and an experienced nurse should be obtained who is accustomed to attend such patients, and who understands how to manage their whims and caprices—for a scolding, contradictory, or inattentive nurse, will effect more injury than benefit, by increasing the excitement and fury of the patient. If the female be very hoisterous and unruly, attempting violence, it may become necessary to employ some restraint, as a strait waistcoat, but this must not be used without it is absolutely required; frequently, an observation to the nurse, in the presence of the patient, that this will have to be employed, will at once calm the most raving maniac. She should never be left alone, and the windows of the apartment which she occupies should be well secured, and all knives or other dangerous instruments, with which she might effect suicide, or injure others, must be removed. The diet must be nutritious, using food of ready assimilation, as, milk, solution of gelatin, white of egg, etc.; and should there be much depression of the system, stimulants will be required. It is frequently the case that the patient will refuse to take either food or medicine. A proper amount of food must be taken within the twenty-four hours, and the medicine may frequently be concealed in it; but when she obstinately refuses food, a cold douche, if not contra-indicated, a reference to the strait waistcoat, or persuasion, may succeed in causing her to eat. Sometimes, if left within her reach, she will eat the food when under an idea, probably, that she is unobserved. It is always proper, when it can be accomplished, after the severity of the first attack has subsided, to have the female exercise as much as possible in the open air, but not to such an extent as to cause fatigue. There is frequently an anæmic condition of the system in this disease, which the practitioner should carefully observe, and for which some ferruginous preparation will be found to act like a charm.

In the early stages of puerperal insanity, it is not prudent to allow the female to see her husband, child, or friends, as it generally proves injurious, by giving rise to ideas, or mental efforts, which increase the cerebral disturbance; but, in the passive or chronic stages, short and distant interviews are frequently followed by an abatement of the

mental derangement. And, whenever it is deemed desirable that she should see her child, she must not be permitted to handle it, lest in a sudden maniacal fit she should destroy, or seriously injure it.

In the melancholic form, nutrition, anemia, and debility, are chiefly to be attended to; prescribing a good, nutritious, easily digestible diet, moderate exercise in the clear, open air. chalybeates, quinine, and an attention to the skin and to the alvine and renal discharges. The patient should be placed under cheerful, attractive, and pleasing surroundings, in order to lessen the melancholy disposition, while any excitement of the nervous system must be avoided, or be promptly calmed by appropriate means. Tonics will generally prove useful for patients much enfeebled. In both forms of mania, if the mind can be properly directed, it will prove a valuable auxiliary in the treatment. In one case, the most desirable results followed the internal use of minute doses of Phosphorus and Nux Vomica, with full doses of Phosphate of Lime.

When there is reason to anticipate an attack of mania at the parturient period, either from a hereditary predisposition, from insanity at a former labor, or from the symptoms heretofore described, a proper course of treatment should at once be instituted. The bowels, especially, should be kept regular, and no crude, indigestible, or other improper articles of diet should be allowed. All sources of irritation should be removed, the mind must be kept free from exciting or depressing influences; coition during the gestating period must be positively forbidden; moderate exercise must be advised, but not to the extent of fatigue; the female should not be allowed to remain alone, and the company permitted to visit her must be carefully selected, refusing admittance to those who occasion too great a degree of mirth, as well as to those who are fond of dispensing horrible and melancholy news, whether true or false; pleasant, cheerful, and prudent individuals only should be selected. If the patient be sleepless, Bromide of Potassium, Chloral Hydrate, Hyoscyamus, or other hypnotic agent may be used; or subcutaneous injections of the same; and, in certain cases, nervines will be of decided utility, as, fluid extract of Scutellaria, or of Asclepias, Lupulin, Pulsatilla, Gelsemium, etc. Plethora must be overcome by diuretics; anæmia by chalybeates; and debility by bitter tonics and such other invigorating measures as may be found serviceable. The Parturient Balm will be of advantage in instances where symptoms of the trouble are manifest before delivery. Should there be a constant, dull, or severe pain in the head, cooling lotions to the head, sinapisms to the back

of the neck, with rest and quiet, will, in conjunction with the other means, generally remove it, and prevent the attack at the puerperal season.

Females are subject to a condition slightly resembling peritonitis, and which has been named **INTESTINAL IRRITATION**, by Dr. Marshall Hall, and *Acute Tympanites*, by Dr. Ramsbotham. It may be owing to some peculiar excitement or irritation of the lining membrane of the intestinal tube, occasioned by a constipated condition of the bowels, improper food, or irregularities of diet, which, by debilitating the muscular fibers of the intestines, causes, soon after delivery, a sudden development of gas.

The attack occurs generally two or three days after delivery, being ushered in with rigors, which are more or less severe, and are succeeded by increased heat and dryness of the skin; rapid pulse, fuller and firmer than in peritonitis, or fluttering and tremulous; tongue red, sometimes furred; countenance changed, but not as anxious as in peritonitis; severe headache; intolerance of light and sound; constant wakefulness; and often delirium. At an early period the abdomen swells rapidly and to an enormous extent, being very tense and painful, and the pain is aggravated by pressure; frequently the transverse colon can be distinctly traced. The secretion of milk becomes suspended, as well as the lochia; the patient lies upon her back in a state of languor, being averse to conversation, or any kind of disturbance; the legs are usually drawn up, and the female appears indifferent to everything about her. As the disease progresses, the pain, and swelling of the abdomen increase, the tongue becomes dry and brown, with vomiting of offensive matter, hiccough, low, muttering delirium, subsultus tendinum, and other symptoms common to the last stage of fever.

DIAGNOSIS.—The principal distinguishing mark between this disease and peritonitis, is the period of abdominal enlargement. In peritonitis the first symptom is pain, and the swelling does not come on until the disease has existed sometime; in the disease under consideration the swelling manifests itself first, and the pain is subsequent, being, probably, occasioned by the inordinate inflation of the intestines, together with a morbid state of the nerves. In peritonitis the patient is anxious as to the termination of her disease; in the present affection there is a great loss of nervous energy, occasioning a complete state of listlessness.

PROGNOSIS.—A subsidence of the tenseness, swelling, and pain of the abdomen, with the pulse becoming more natural, the tongue clean and more moist, the skin cool and soft, the bowels becoming

free with expulsion of large quantities of wind, vomiting ceasing, intellect unimpaired, a desire for food, and an attention to surrounding circumstances, are indicative of recovery.

TREATMENT.—Should there be any undigested food upon the stomach an emetic may be administered, to be followed by a purgative. The compound powder of Jalap may be given to produce free evacuation of the bowels; at the same time an injection of hot water may be given, to aid the evacuation, as well as to relieve the pain. If the patient be very feeble, the purgative may be omitted, using the injection instead, as may be required.

After the bowels have been freely relieved, *Nux Vomica* will be called for in many cases; the indication will be the broad, expressionless tongue, nausea, and pain in the bowels. *Dioscorea* is the remedy where there are cramps, and a pain like colic. *Podophyllin* should be given in case the tongue shows the heavy coat at base. Much benefit will also be derived, in some cases, from the use of the tincture of *Xanthoxylum*. These agents allay irritation, aid in expelling the gas, and gradually restore the tone of the intestines. Cloths wet with hot water, or hot fomentations of Hops and Tansy, or other bitter herbs, will prove highly valuable when applied over the abdomen.

The Oil of Turpentine, exhibited externally and internally, has been highly extolled in this disease. Externally, it is to be applied over the surface of the abdomen; internally, one or two fluid drachms, mixed with the white of an egg, may be given, and the dose repeated every four hours; or, if rejected by the stomach, an ounce of it may be injected into the rectum.

Should any inflammatory symptoms be present, they must be combated by the means already explained.

The patient should be kept quiet, her room being somewhat darkened, and no visitors should be permitted to enter. After the evacuation of the bowels, when the swelling begins to subside, a nutritious, easily-digested diet should be allowed, with some stimuli if required. Tonics may also be exhibited. I know of no better agent to rapidly restore the tone of the intestines, after all the dangerous symptoms have been removed, than the continued use of small doses of *Nux Vomica*. *Pulv. Hydrastis* and *Bismuth* answers a very good purpose in some cases also.

CHAPTER LI.

INFLAMMATION OF THE BREASTS — MAMMARY ABSCESS — EPHEMERAL FEVER—WEED—MILIARY FEVER—SORE MOUTH OF NURSING WOMEN.

INFLAMMATION OF THE BREASTS, *mammary abscess*, or *mammitis*, is of frequent occurrence among nursing women; it may happen at any period of lactation, but is most commonly met with during the first month after delivery. At first, the inflammation is usually limited to a circumscribed spot, but continues to extend into the surrounding parts, until the whole breast becomes more or less involved; occasionally, the whole breast may be affected from the beginning, and, sometimes, both breasts become inflamed simultaneously. There is a strong tendency to suppuration in inflammation of the mamma, which is often very difficult to prevent; and when the constitution suffers therefrom, as by anorexia, nausea, feeble, rapid pulse, great emaciation, excessive nervous irritability, and mental anxiety and despondency, together with chills, exhausting sweats, etc., we are by no means astonished that delirium of a wild character, closely resembling puerperal mania, may sometimes be manifested.

This affection may be caused by an increased accumulation of milk within the lactiferous tubes, occasioned by the mother not allowing her child to suck, on account of tender and excoriated nipples, or, perhaps, because she absents herself from her child, frequently and at long periods, in order to enjoy parties and places of amusement, thus neglecting to give to the distended breasts the relief they require. A neglect of this kind, repeated several times, will readily induce an abnormal condition of the glands. Epidemic (or endemic) influence appears to be a predisposing cause. The disease may also be produced by cold, and this is undoubtedly a common exciting cause. It may likewise follow mechanical injuries, such as blows, bruises, compression from tight lacing, etc., when the breasts are distended with milk, and may also be induced by strong mental emotions. All females are subject to it, but those of a strumous diathesis, or who are delicate and feeble, are especially so. It is more common to primiparæ; but, many females suffer from it after each confinement.

SYMPTOMS.—The inflammation may be limited to the subcutaneous areolar tissue; to the gland; to the areolar tissue beneath the

gland; or, may extend to two or all of these combined. Generally, the first symptoms experienced are more or less severe rigors, followed by fever; a shooting pain in the breast is complained of by the patient, which is aggravated by pressure, and accompanying which there is a gradual swelling of the organ. Upon examining the breast at an early period, a circumscribed hardness may be observed, within which the pain is located, and the skin over which presents a natural appearance. As the disease progresses the swelling becomes more extensive, the pain more severe, the skin hot and shining, and of a dusky-red color, and finally the swelling becomes soft and slightly oedematous, with more or less marked fluctuation, indicative of the formation of pus. The symptoms now increase in severity; the patient becomes fretful in consequence of the severe pain, distressing shiverings, want of sleep, and nocturnal perspirations, all of which occasion a gradual loss of appetite, strength, and flesh. Sometimes nausea is present, and not unfrequently an obstinate diarrhea.

The pain is more severe in proportion to the extent and depth to which the gland is involved. If the inflammation be superficial, the pus is laudable; if it extend deeply, there is always sloughing of considerable magnitude present, and death from hemorrhage has occurred from the blood-vessels of the part becoming involved in the destructive process. The suppuration ensues more rapidly when the inflammation is superficial, or in the cellular substance under the skin.

DIAGNOSIS.—The subcutaneous variety of mammitis presents the usual manifestations of phlegmonous inflammation; if suppuration ensues, fluctuation will be detected, and the part at which the abscess points will become thin and dark colored, with generally but one abscess—when the gland itself is attacked, and which is more commonly the case, the pain will be more severe, and of a lancinating character; there will be more constitutional disturbance, the portion of gland involved becomes indurated, suppuration ensues more slowly, and numerous abscesses are formed. In the deeper-seated variety, the pain is located more deeply and is aggravated by pressure upon the gland, though, unless the subcutaneous areolar tissue be involved, there will be no pain upon touching or slightly pressing upon the surface of the breast; the inflammation, which is generally circumscribed in the former varieties, tends to become diffuse; and when suppuration occurs, the patient experiences chills and exhausting sweatings, the surface of the breast is smooth and uniform, without any induration, and, when much enlarged, there is an unpleasant sensation of distension and weight.

When these varieties exist together the symptoms common to each will be present, according to the variety and the severity of the inflammation.

PROGNOSIS.—Mammitis, when not properly treated, generally terminates in suppuration; the character of the abscess, and of the constitutional symptoms, depending upon the seat and nature of the inflammation. In the subcutaneous variety, if resolution be not effected, suppuration will ensue in from five to ten days, the abscesses from which may be cured in from seven to twenty-one days. When the gland is attacked, the duration of the disease is much longer, and suppuration occurs very slowly, forming abscesses, which are developed one after another at different intervals of time, and which may continue even under the most appropriate treatment from two to four, and occasionally, even to eight months.

When the tissue between the gland and the walls of the thorax is attacked, in most cases, we may not be aware of it until the suppuration has manifested itself; and even when the diagnosis is readily made out at an early period, it is very difficult, if not impossible, to prevent suppuration; and the abscess continues a much longer time than in the other varieties, generally discharging through a number of fistulous canals. I have seen cases in which from extension of the disease, the whole breast has sloughed away, giving rise to a large, open, as well as fistulous abscess, discharging most profusely, and continuing for a period of two and even three years. Lactation is not always arrested; this depends entirely upon the extent of the sloughing, and the peculiar tissues involved, and is more common with the variety in which the gland itself is implicated. Sometimes, the structural lesion is such as to arrest the function of lactation for a considerable time, but which becomes eventually restored; at other times the loss of this function may remain permanently.

This disease is more unfavorable to patients of a strumous habit, and, though it rarely proves fatal, yet it requires prompt and energetic treatment. It is frequently of tedious and difficult cure, and has been known to arouse a dormant and inactive predisposition to disease, into a fatal activity.

TREATMENT.—The indication for treatment is to promote resolution; but, if the disease has continued for two or three days, with considerable heat and pain, resolution can seldom be effected, and then, means must be adopted to promote suppuration. Suppuration usually occurs in ten or twelve days, seldom sooner.

In order to prevent the inflammation from terminating in suppuration, the treatment must be active and persistent. It is well, in some cases, to administer a mild cathartic in the beginning. The proper sedative should now be selected, which will usually be Aconite; to this *Phytolacca* should be added, as a specific, in glandular inflammation. About ten drops of each should be prescribed, and given in teaspoonful doses every hour. In the subcutaneous and glandular varieties, the breast should be painted two or three times a day, with some stimulating preparation; I generally employ a liniment made of equal parts of Oil of Cajeput, Oil of Sassafras, Olive Oil and Camphor. After applying this, a warm poultice or fomentation may be applied, and which should be changed two or three times a day, at the periods of bathing with the liniment.

Although I have just recommended the application of a fomentation or poultice to the breast, it is only because others have frequently used them with advantage. Prof. King recommends the following ointment, which may be applied immediately after having bathed the breast with the above liniment: Take of Castile Soap six ounces, good Lard four ounces, yellow Beeswax two ounces; finely cut, or shave the soap, add to it the other articles, and melt the whole together by means of a moderate heat. When thoroughly melted and incorporated, remove the vessel containing them from the fire, and when nearly cool, add gradually three fluidounces of Jamaica Spirits, in which three drachms of Camphor have been previously dissolved. Continue stirring the mixture until it is cold.

Prof. King speaks of its use as follows:

This ointment has been used with success in every case where it was applied at an early stage, or previous to suppuration; it removes all pain and swelling in from twelve to thirty-six hours, according to the duration of the disease. I have frequently found it efficacious in cases where the patient had suffered severely for twenty-four hours, and when I had every reason to believe that the suppurative stage had actually commenced. I employed it with constant success for nearly fourteen years before having made it known to the profession.

The manner of using it is as follows: Cut a piece of linen in a circular form, of the size of the whole breast, leaving an aperture in the center sufficiently large for the nipple to pass through. Then soften a sufficient quantity of the ointment by a gentle heat, and spread it on the linen. Apply this over the breast, as warm as can be borne; at intervals of four or six hours, remove it, soften it as before, and reapply it to the breast immediately after having bathed it with the

stimulating liniment. A fresh application of the ointment will be needed only once in every twenty-four hours; the patient should be kept quiet in bed, and the breast should be carefully supported by a bandage, or some similar means. Other local applications have been advised, as: carefully painting the inflamed surface of the breast with tincture or solution of Iodine, solution of Belladonna extract, etc., but I have never used them in this malady.

During the first stage of the disease more especially, it is of great importance to keep the breasts as empty as possible, and if this can not be effected by the infant, other means must be resorted to, as, some older person accustomed to the business, a young pup, or an exhausting pump. And any febrile symptoms may be mitigated, as well as pain and nervous irritability, by the exhibition of the compound powder of Ipecacuanha and Opium, Sp. Trs. of Aconite or Veratrum, with Phytolacca. When the pain is excessively severe and the febrile symptoms run high, it will be better to avoid feeding the infant at all from the affected breast, and, in some cases, it will be proper not to annoy the mother and increase her sufferings by requiring her to give it suck, but to feed it for a short time in some other way; if possible, have a wet nurse employed. In the glandular and subglandular varieties especially, Sulphate of Quinia will be found a most valuable agent, mitigating the constitutional symptoms, and often preventing suppuration; it should be given so as to effect a prompt influence upon the system, which should be kept up for some length of time.

If, however, matter should form, then the employment of poultices to hasten its progress will be found of considerable value. And now, the infant should not be permitted to use the milk of the affected breast any longer, because, with the milk, which has lost its nutritive qualities, it may be injured by the reception of pus into its stomach; the milk must be evacuated by other means. Fresh Poke-root roasted in hot ashes, in the same manner as the potato, until it is soft, then mashed and applied over the breast as a poultice, will materially forward the suppurative stage, though its action will produce more suffering than the poultices ordinarily employed for such purpose. The addition of pulverized Lobelia, moistened with a mixture of warm water and vinegar, to the roasted Poke-root, will materially enhance its value. Flaxseed, Elm, or any of the common non-irritating agents may be used for the poultice. In connection with the local applications, the internal administration of Phytolacca with the sedative should be continued, and will usually be followed by prompt and favorable results. It has been stated that if this treatment by Poke-

root, internally and externally, be commenced at an early period of the attack, suppuration will be prevented, and the disease will terminate by resolution, even in the deeper-seated varieties.

When suppuration has occurred, the following rules should be observed :

“ If the abscess is placed superficially, or on the anterior surface of the breast, and progresses with rapidity, not causing an undue degree of suffering, it will be better not to interfere with it, but to allow it to take its natural course.

“ If it be deeply situated, progressing slowly, giving rise to severe local sufferings, and is attended with a high irritative fever, profuse perspiration, and want of rest, much time will be saved, as well as considerable suffering, by opening the abscess at the proper period, with a probe or lancet, and permitting the pus to escape,” being careful however, not to be in such a hurry as to make an opening before pus has formed. And always, in opening the abscess, carry the incision parallel with the lactiferous vessels, so as to avoid dividing them, as much as possible. In all cases, it will be well to introduce a tent into the opening to prevent it from closing before the pus has been entirely discharged.

“ If there is a thick covering over the abscess, it is improper to penetrate it with the lancet, because the opening will not succeed in establishing a free discharge of matter, for, as the aperture closes by adhesion, the accumulation of matter proceeds, and ulceration will still continue. On this account, the opening should be made where the matter is most superficial, and where the fluctuation is distinctly perceptible, and its size should be proportioned to its depth.” Also, keep it open by the introduction of a tent.

“ When the abscesses are very deep, with several sinuses, the best mode of treatment, is to inject into them a solution of two or three drops of strong Sulphuric acid in a fluidounce of Rosewater; and this may likewise be applied on folds of linen cloth over the bosom, by which the secretion of milk is checked, and adhesion is produced.”
(*Sir A. Cooper.*)

If the ulcer does not readily heal, or assumes an indolent character, apply some sesqui-carbonate of Potassa to it, and dress it with the red oxide of Lead plaster, or the compound Lead ointment, treating it similar to ulcers on other parts.

Should there be a troublesome oozing of blood from the wound made by the lancet, in opening the abscess, it must be treated by the application of dry lint, with sufficient compression.

In the inflammatory stage, the diet must be light and non-stimulating; during the suppurative discharge, a nourishing diet should be used, and to support the strength and aid in the formation of healthy pus, Port wine and Cinchona, or the compound wine of Comfrey, will be required. If there is exhaustion with considerable irritability of the system, Morphia and Quinia combined, will be found advantageous.

Beside MILK FEVER, which has been referred to on another page, there are two other forms of fever which may be occasionally met with in practice. One is termed EPHEMERAL FEVER, or WEED, and is more especially met with in cold, moist weather, among those who reside in low, marshy places, or in the neighborhood of stagnant ditches. It may likewise be occasioned by cold, indigestion, constipation, fatigue, mental agitation, want of rest, and improper food. It appears usually in from six to nine days after delivery, and seldom continues over twenty-four or forty-eight hours, whence its name, ephemeral. It commences with severe and long-continued rigors, succeeded by heat and profuse perspiration. During the shivering there will be pain in the back and various parts of the system, shrunk features, eyes hollow, skin dry and harsh, with the integuments at the fingers' ends livid and corrugated, thirst, rapid and perhaps irregular pulse, or feeble and indistinct; and various other distressing symptoms, which increase in severity as the rigors are about passing off. The hot stage is characterized by a throbbing of the temples; great heat of the surface; flushed face; severe headache, generally referred to the forehead and eyeballs; soreness of the breasts and of the abdomen; rapid, full, hard, and firm pulse; and a diminution of the various secretions, with occasional delirium. This is followed, after a longer or shorter time, by a profuse perspiration, which appears first on the forehead, neck, and chest, and which is succeeded by an abatement of the fever, and an amelioration of all the previous symptoms.

This disease may be mistaken for puerperal peritonitis; but the *violence* and *long continuance* of the rigors, the absence of marked abdominal tenderness on pressure, and the very profuse perspiration which is followed by relief, will enable us to distinguish it, as well as the absence of a return of the paroxysms. It is seldom a dangerous disease, unless, by improper management, it be allowed to pass into a continued or intermittent fever.

TREATMENT.—The indications of treatment are to shorten the various stages of the disease as much as possible. During the *cold stage*, apply warmth to the surface, as bottles of warm water, or warm bricks, etc., to the feet, knees, thighs, and axillæ, and warm flannels over the stomach and abdomen; in addition to which, warm drinks and cordials may likewise be given; and, as the case may require, adopting other means similar to those which would be employed in the cold stage of ague. As the bowels are frequently constipated, an active purgative should be administered either in this or the subsequent stage; sometimes an emetic will prove advantageous.

In the *hot stage*, the surface should be bathed with warm water, and the proper sedative administered; in some cases Sulphate of Quinia may be given, in three-grain doses, for a day or two. If there is much nervous irritability, Pulsatilla or Gelsemium will be found very beneficial agents; and these may be continued for some days after the cessation of the disease, to allay the irritability and lessen the disposition to any secondary attack.

In the *sweating stage*, the Sulphate of Quinia may be continued alone, or in conjunction with Prussiate of Iron; and the patient should use some of the tonics; or small doses of the Aromatic Sulphuric Acid will frequently overcome the trouble.

The several symptoms which may present during each stage, must be met by measures similar to those employed when they occur in other febrile affections. After the paroxysm has ceased, the diet should be nutritious, with stimulants if there be much depression. Exposure to cold should be guarded against, or any other exciting cause of the disease; and it should be ascertained by a careful examination whether any derangement of the uterine system exists, that it may be promptly subdued.

The other febrile affection referred to above, is termed **MILIARY FEVER**: it is still more rarely met with than the preceding, though in former days it was quite common, and was considered a formidable disease. It may occur as a primary affection, and independent of the parturient state; but more usually it appears as a symptom connected with puerperal, milk, or ephemeral fevers, especially in those cases where perspiration is permitted to become too profuse. Females of debilitated constitutions are more subject to it than others. It generally occurs between the second and twelfth day of delivery, and may be excited by fatigue, relaxation, impure, overheated air, stimulants, rich or improper food, excessive evacuations, constipation, and personal uncleanness.

It commences with chills, succeeded by fever, and perspiration of an acid, penetrating odor. There is sickness and languor, with a hot skin, frequent pulse, depressed spirits or great anxiety of mind, a great weight about the chest, severe headache, dull and watery or inflamed eyes, with throbbings within the orbits, tongue furred white with raised papillæ and red edges, ringing in the ears, and occasionally aphthous ulcerations of the mouth and fauces. The lochial and lactiferous secretions are diminished or suppressed, and a pricking or itching of the surface is generally complained of; occasionally there is a sensation of numbness in the extremities. The perspiration is usually followed by no mitigation of the symptoms. After these symptoms have continued for a few days, the skin begins to feel rough like the cutis anserina, and in a short time the eruption appears about the forehead, neck, and breast, from whence it gradually extends to the trunk and extremities: it rarely affects the face. It appears in the form of small, red, generally distinct vesicles, about the size of millet-seed, having a red or inflammatory appearance surrounding their base. In a few hours the vesicles assume a white or yellow appearance, from the change effected in the lymph contained in them, and in a few days they dry up, and the crusts fall off in small branny scales. The eruption, unless the disease be primary, seldom affords any relief to the symptoms, and may occur frequently and irregularly, should the fever and perspiration continue. Occasionally, the eruption has been met with where but little or no fever was present. The disease is seldom serious, unless the perspiration be suddenly checked, or the eruption recede, under either of which circumstances fatal results may ensue.

The disease may be determined by the character of the tongue, the oppression at the chest, and the peculiar, strong, and sour smell of the perspiration.

TREATMENT.—Keep the room well ventilated and cool, gradually lessening the amount of bedclothes, but being extremely careful not to allow the patient to “catch cold.” Give laxatives to keep the bowels regular, and when there is derangement of the stomach, an emetic may be useful. The drink of the patient should be cold and acidulated; *Rhus Tox.* should here be given in small doses, together with *Aconite*. *Fowler’s Solution* and *Apis* will be useful also in some cases, as well as small doses of *Iris*. *Sulphate of Quinia* will be found of much service during convalescence.

On the abatement of the febrile symptoms, the diet may be improved and mild tonics employed. Should there be aphthous ulcerations, they may be washed or gargled with a solution of fluid

Hydrastis, or Borax water may answer the purpose. If the disease accompanies other affections, especial attention must be directed toward the treatment of these, for the secondary difficulty will continue more or less severe until the primary one is subdued.

Women who suckle, or who have advanced to the latter months of pregnancy, are sometimes affected with a sore mouth peculiar to themselves, somewhat resembling follicular stomatitis, or follicular inflammation of the mouth; other females and men being exempt from it. It is generally known as the SORE MOUTH OF NURSING WOMEN (*Stomatitis Materna*). The most robust constitution, or the sickly and delicate, are indiscriminately attacked by it; those, however, of costive habits, dyspeptic symptoms, and hepatic affections, seem to be more liable to its attacks than others. And when there is a tendency to phthisis, or some constitutional disease, the debility produced by it is of a much more serious nature, than in vigorous and sound systems. I have frequently met with it in females who were liable to attacks of erysipelas, and also those whose constitutions had been injured by the use of mercurials. If this disease is allowed to go on for any length of time without being relieved, the morbid irritation of the tongue and fauces extends to the stomach and bowels, in which case it is apt to prove fatal. I have known the disease to terminate in death during the third, fourth, and fifth puerperal week, even after the child had been kept from the breast.

The children of females laboring under this affection are generally healthy and robust, being well supplied with milk, the secretion of which is commonly abundant until the last stages, when the patient being reduced by starvation, this secretion fails. The means usually employed for common sore mouth, or follicular inflammation, will not effect any benefit in this disease, unless it be very mild; and, in many instances, an energetic treatment must be pursued, or the patient will die. Death has taken place within a month from the appearance of the disease, and, again, patients have lingered for three or four months before the fatal termination. It is a singular malady, nearly always disappearing upon weaning the child; yet weaning is not always necessary, nor is it at all desirable, as there is a greater disposition to a return of the disease at every future accouchment, than in those cases where proper treatment has effected a cure, and restored the constitution to its usual normal condition. It must be recollected, that in patients who have been cured of this disease, there will exist a strong tendency to its return from slight causes, at least until the

child is weaned; as, from exposures to cold, fatigue, indigestible diet, etc., and which in consequence, must be carefully guarded against.

This disease appears to depend on gastric and hepatic derangement, in connection with a vitiated state of the blood, and is more common to those subject to erysipelatous affections, or of strumous diathesis.

SYMPTOMS.—The accession of the disease is often very rapid from apparent health—extremely so: within three hours after seeing the patient in health, perhaps actively engaged in household matters, and not suffering from any unusual irregularity of the stomach and bowels, she will be found with a scalding of the tongue and fauces, and unable to converse or take food. The first sensation is uniformly described by the patient as a *severe scalding* of the tongue, with pain, at times intense. There is also a peculiarity of the tongue, its color, especially in the severer instances, being *pink*; and its edges and the roof of the mouth have a deeper hue of this color, often accompanied with a most profuse watery discharge from the mouth, extremely hot, so much so as to give a scalding sensation to the face when passing over it. The appetite is usually very good, often ravenous, but no food or drink, except the blandest, can be taken into the mouth, without producing more or less intense pain: the food *must be* of a mucilaginous or farinaceous character. After a continuance of this state of the mouth for a few days or weeks, slight ulcerations on the end or edges of the tongue manifest themselves, as also about the different parts of the fauces. Sometimes the disease gradually commences with slight ulcerations on the tongue, and this general scalding of the tongue and fauces follows. The bowels are usually constipated, or soon become so; no fever, but at times excessive irritation of the whole system, in consequence, probably, of the want of rest; as the continued pain of the fauces, and the excessive and constant flow of burning saliva prevent any comfortable rest day or night. The tongue is generally free from any coat, or it may have a light, white one. Occasionally, although the surface of the ulcerations is not deep, yet they continue to increase in width, and the inflammation spreads all over the mouth. When it extends from the mouth and fauces to the bowels, diarrhea ensues, and usually, in such cases, the soreness of the mouth becomes better, but the case is attended with more danger. When the disease is severe there will be an anæmic condition of the system, with considerable prostration of the vital energies.

TREATMENT.—In the first two cases of this disease which I attended, having never seen a description of the disease in any medical work, I pursued the usual treatment for aphthous ulcerations, and lost

my patients; since which, my success in the treatment of it has been such as to justify me in recommending the following plan:

In the severe or obstinate cases, an emetic frequently answers a good purpose, and, if the patient is not too weak, should be given. The emetic I usually prefer is the compound powder of Lobelia. In the milder cases emetics may generally be dispensed with.

The constipation may be overcome by the administration of such mild means as will prove efficient and not exhaust the patient. Jalap acts very well in some cases; or, where the tongue shows the heavy yellow coat at base, Podophyllin should be preferred.

Internally, the tincture of Chloride of Iron may be given, in doses of twenty drops, and should be repeated every two or three hours. Formerly I was in the habit of administering alteratives, as the compound syrup of Sarsaparilla, compound syrup of Yellow Dock root, or the compound syrup of Stillingia, with a proper proportion of Iodide of Potassium added to the syrup used; but, though these will be frequently found useful, I think the tincture of Iron above advised will be found more generally successful, from its direct influence on the capillary vessels, and the beneficial action of the Iron in anæmia. A saturated solution of Chlorate of Potassa, in doses of a fluidrachm, repeated every three or four hours, has frequently proved serviceable. And in some instances Bromide of Potassium, or of Ammonium, in conjunction with Sp. Tr. Iris or Nux Vomica, has given prompt relief.

Sometimes diarrhea is present, in which case no purgative must be administered. The tincture of Chloride of Iron in doses of ten drops, diluted sufficiently, and repeated every hour or two, will be found to have a most excellent influence over diarrhea, especially when used in conjunction with a stimulating and astringent injection, such as a mixture of Tannic Acid, one drachm, Glycerine, Elm mucilage, of each half a fluid ounce. Mix for an injection, to be repeated immediately after each stool. Benefit may also be derived, in diarrhea, by the use of Liquor Bismuth, in teaspoonful doses, two or three times a day. Rice-water, Elm-water, infusion of Epilobium, Blackberry root, or of other vegetable astringents, may be drank freely.

In nearly all instances of this disease, a deficient action of the cutaneous vessels will be met with, and which it is absolutely necessary to remedy. If, as is sometimes the case, the disease comes on previous to parturition, or immediately succeeding delivery, the whole body and limbs should be bathed daily with a weak alkaline wash, to be followed, after drying, with some stimulating application, as whisky

and water, etc. And as soon after delivery as may be prudent, the spirit vapor bath should be administered twice a week, or according to the strength of the patient. Attention to the surface is an *exceedingly important* part of the treatment.

The aphthous condition of the mouth and fauces must also be attended to locally. A solution of Nitrate of Silver, from sixty to eighty grains of the salt to a fluidounce of water, will generally be found useful in allaying the more severe scalding and painful sensations; the whole internal surface of the mouth should be washed with it once every day, or every other day, and it will be best to apply it at bedtime, that the female may obtain some sleep afterward. Solution of Perchloride of Iron, properly diluted, and applied one, two, or three times a day to the aphthæ, is likewise serviceable in many cases; the same may be said of a weak solution of Sulphate of Copper. During the day, the mouth and throat must be frequently washed or gargled with a solution of one of the following preparations, a small portion of either of which may be occasionally swallowed with benefit: Fluid Hydrastis, Borax, Chlorate of Potassa, Phytolacca or Baptisia. Undoubtedly other astringents, and agents which influence mucous tissues, will be of value. Solution of tincture of Chloride of Iron, or of diluted Carbolate of Iodine,* sprayed upon the affected parts, have each been found of efficacy.

From a belief that this malady is due to a lack of phosphatic salts in the blood—these salts not having been assimilated sufficiently rapid to supply the necessary materials for the growth and nutrition of the pregnant woman and her child—Dr. N. S. Davis has advised the internal use of the compound syrup of the Hypophosphites, in doses of one or two fluidrachms, three or four times a day, commencing its use as soon as the disease manifests itself, and continuing it during the entire period of lactation. If anemia exist, the Pyrophosphate of Iron may likewise be used in addition.

The diet should be light and easy of digestion, avoiding fats, stimulating liquors (though wine is indicated when there is a great prostration), gross diet, and everything which will cause acidity of the stomach, or in any way retard or derange the digestive functions.

*The diluted *Carbolate of Iodine* to be prepared as follows: Take of Iodide of Potassium, ten to twenty-five grains; Iodine, five grains; crystallized Carbolic acid, five grains; Glycerin, clear, soft Water, each, nine to twenty-seven fluidrachms; mix and dissolve the solids.

It is always advisable to cure this affection, if possible, without weaning the child, as the female is thereby rendered less liable to its recurrence at another parturient period. But, if the soreness and pain are excessively intense, and appear to be intractable to all treatment, and more especially when diarrhea is present, weaning may become absolutely necessary, in order to save the patient's life. In these cases, and also where a strong disposition exists to a return of the disease at each accouchement, it may be entirely cured, checked, or its severity very much ameliorated, by regulating the bowels during pregnancy with the compound powder of Rhubarb, and preserving, as much as possible, a normal condition of the system, by some alterative treatment persistently used during the whole period of gestation. Prof. Scudder states that he has found tobacco smoking to be of more efficacy in this affection, than any other local application, and he prefers it to all mouth washes.

CHAPTER LII.

CYANOSIS—RETENTION OF URINE—RED GUM—JAUNDICE—INFANTILE OPHTHALMIA — FLATULENT COLIC — CONSTIPATION — UMBILICAL HERNIA — EXCORIATION OF THE NAVEL — HEMORRHAGE FROM THE CORD — HEMORRHAGE FROM THE NAVEL—NÆVUS MATERNI—TONGUE-TIED—HYDROCELE—SWELLING OF THE BREASTS — HARE-LIP.

As soon as the child is born, and breathes, a change is effected in its circulation; the blood which had partly circulated from the right into the left auricle, through the foramen ovale, during intra-uterine existence, as well as that which had flowed through the ductus arteriosus, from the pulmonary artery into the aorta, now changes its direction and flows toward the lungs, through the pulmonary artery. However, cases are occasionally met with, in which no change of this kind is effected, and the blood continues to pass from the right to the left side of the heart. From this circumstance, the blood is imperfectly oxygenized, as manifested by the livid or blue color of the lips and other parts of the body which are protected by only a thin cuticle. This condition is termed *Blue Disease*, *Morbus Cæruleus*, and *Cyanosis*.

The two auricles of the heart form nearly a single cavity, at the fifth month of pregnancy, in consequence of the imperfect development of the septum auricularum; but this septum gradually matures until at full term the foramen ovale is generally considered to be nearly or quite occluded.

Cyanosis may be occasioned by a patulous condition of the foramen ovale, or by some malformation, as, deficient ventricular septum, constricted pulmonary artery, or any other abnormal conditions of the heart or its blood-vessels; frequently, the foramen ovale may continue open after birth, or may re-open; and, anything which interferes with the return of the blood to the heart, preventing the formation of arterial blood, may give rise to the blue color observed in this disease.

The *symptoms* of cyanosis are a violet, blue, or purple color of the surface of the body, especially the face, lips, hands, feet, and genitals, and which color becomes increased by exertion or excitement. In addition to this, indications of cardiac disease are present, in a greater or less degree, as, paroxysms of dyspnoea of long or short duration, palpitation, and sometimes syncope, diminished temperature of the surface, and an extreme susceptibility to the influence of cold, with a strong disposition to serous effusion. The child is most commonly dull and sleepy, its respiration being slow, and frequently labored, and eventually spasms and convulsions occur previous to the fatal termination. However, it must be borne in mind, that oxygenation of the blood is less important to an infant than to an adult, and infants have, at times, presented symptoms of imperfect oxygenation of the blood, without any detrimental results.

Post-mortem examinations have, in the majority of deaths by cyanosis, discovered some malformation of the heart, its blood-vessels, or of both. Meckel states, that "even when the foramen ovale has remained open, there may be no cyanosis, if the pulmonary artery is properly formed."

TREATMENT.—Although cures have been effected in this disease, yet we are not to anticipate such results as a general rule, and especially if the infant be attacked with spasms or convulsions.

It is always proper to attend to the position of the child, as recommended by Professor Meigs, which is, to place it on its right side, with the body inclined at an angle of 30°, the head being the highest part. On a moment's reflection it will be seen that the anatomical, as well as the mechanical relations of the parts, indicate this position, which maintains the left auricle perpendicularly above the right, and the

blood must thereby gradually pass into the pulmonary ventricle, from the force of gravity alone. Yet, in cases depending upon malformation, no benefit could result from this or any other position.

In connection with this position, the child must not be allowed to cry or worry, but should be kept as still as possible, and its body should be occasionally bathed with tepid water. Should the natural color of the skin return after several hours, with a freer respiration and a cessation of spasmodic action, all that will be necessary in the way of medicine, is a gentle purgative, or two.

In many cases the disease terminates fatally in a few days, and, sometimes, not until after several months; the affected individual seldom reaches the period of maturity. Whenever the disease does not destroy the patient after a few weeks, there may possibly be some benefit derived by treating him for a chronic disease of the heart.

Sometimes, an infant will pass many hours after its birth with a **RETENTION OF URINE**. This may be owing to the fact that none has been secreted; to an obstruction or debility of the parts concerned in ejecting the urine; or, to some malformation, or closure of the urethra. The first cause may be overcome by the use of such mild diuretics as infusion of Pumpkin seed or Watermelon seed, or by the administration of minute doses of Acetate of Potassa, Santonine or Sp. Tr. Apis Mel.; the second, by placing the child for a short time in a warm bath, and then, after drying it, applying hot fomentations over the region of the bladder. The third cause will require a surgical operation for its removal, according to the character of the difficulty.

A few days after birth, infants are attacked with a cutaneous affection, called **RED GUM** (*strophulus intertinctus*). It is a slight eruption of red, or sometimes whitish pimples, which are surrounded by a reddish halo. This is probably occasioned by the exposure of the surface to the action of the atmosphere, and other external stimulating influences, as well as to changes effected in the capillary circulation by the increased oxygenation of the blood. It is of no importance and requires no especial treatment. The skin should be frequently powdered with Arrowroot, and if there be any derangement of the digestive functions, it may be remedied by an occasional dose of Lime-water, or if the child is nursed from a bottle a small portion of it may be added to the milk. Nurses are frequently

in the habit of giving an infusion of Catnip and Saffron for this affection, and, as no harm can be effected by it, prohibition would not always be prudent.

Infants are likewise liable to a yellowness of the eyes and skin, shortly after birth, termed JAUNDICE; and with this, the urine may also be so colored with bile as to leave yellow stains upon the diapers. Ordinarily, this is of but little consequence, and is generally treated by an infusion of Saffron and Catnip. But when the stools denote biliary derangement, being whitish, clay-colored, or whitish yellow, it may be overcome by the use of the small dose of Chionanthus; or possibly a constipated condition of the mother, in such cases, when relieved will overcome the trouble in the nursing child. The surface should be kept clean by daily bathing. Sometimes, however, in consequence of malformation, or disease of the liver or its ducts, a true jaundice may exist, and which is apt to be of a serious nature; but this is not of very frequent occurrence.

Shortly after birth, say on the second or third day, and sometimes later, infants are frequently attacked with OPTHALMIA (*ophthalmia purulenta infantum*, or *oph. neonatorum*). It commences with a redness and swelling of the lids, and, on awaking, the lids will be observed to slightly stick together. Light occasions pains, and consequently the child keeps its eyes closed. At first, a little whitish matter will be observed lying on the inside of the lower lid, and subsequently a profuse and constant discharge of thick, yellow matter takes place, and which covers the whole eye. If this be allowed to continue without attention, the child may ultimately lose its eye. The *treatment* will consist in cleanliness and agents to lessen inflammatory action, and a frequent bathing of the eye with water, as hot as can be borne, in which a few drops of Fluid Hydrastis may be used. If a more stimulating application is required, eight or ten grains of the Sesquicarbonate of Potassa may be added to a fluid ounce of warm Water. The bowels should be kept regular. Other local applications may also be used with benefit, as a mild solution of Borax with Morphia, or a weak solution of Sulphate of Zinc.

INNUTRITION.—It is sometimes the case that a rich, creamy milk, supplied in abundance by a healthy mother or nurse, does not afford nutrition to the child, nor appease its appetite, but, on the con-

trary, the child is ravenous, rapidly emaciates, has the look of an old person, and suffers from diarrhea, diuresis, or diaphoresis. Whenever a case of this kind is presented, the freshly drawn milk from the mother's breast should be carefully examined. It will, in the present instance, be found to vary in color, be neutral or alkaline, rich in saccharine matter, of specific gravity 1024 to 1035, and under the microscope will be found to contain animalcules, vibriones, and monads (*vibrio lactis*; *monas lactis*). These animalcules are attributed to fermentation of the saccharine element of the milk while yet within the mammary glands; the fermentation being probably due to sexual excitement, together with, perhaps, more or less congested condition of the glands. In these cases the child should be immediately withdrawn from further use of such milk, and be fed by the bottle, using the milk from one cow, which may be properly diluted with Lime-water; or one of the prepared foods may be substituted, among which I prefer the *Malted Milk*.

Infants are frequently troubled with FLATULENT COLIC, which may arise from costiveness, exposure to cold, from being allowed to suckle too much, from irregularities in the diet of the nurse, or some bad quality of her milk. It usually comes on suddenly, and may be known by the violent and incessant screaming of the child, the hardness of the abdominal muscles, and the constant agitation of the limbs, which are extended to their utmost, and then immediately drawn up toward the abdomen, in rapid succession.

The TREATMENT consists in giving a laxative and carminative injection, after which a warm infusion of Peppermint (or Spearmint, should a suppression of urine be present), sweetened, and to which a very small quantity of Supercarbonate of Soda has been added, should be given, as an increased acidity of the stomach is apt to be present; or, the syrup of Rheum Aromatica may be substituted, when further action on the bowels is desired. When the attack is very severe, the bowels and back of the child should be covered with flannels or fomentations, made as hot as can be borne, and the child being held with its abdomen on the nurse's knee, should be *trotted* for some time, while she gives a succession of light taps with her hand on its back, between the shoulder-blades and down to the small of its back. By this means, I have frequently removed the most severe cases of colic, where the child had been screaming incessantly for hours, and had taken Paregoric, Godfrey's Cordial, hot Gin Sling, etc., without the least benefit.

CONSTIPATION, is common to some infants, and often proves obstinate, being rather perpetuated by the administration of purgatives. The introduction of a suppository of soap is, generally, the best agent that can be used in order to procure a stool; two evacuations should be obtained daily, at regular hours. And in the interim, the following should be injected into the rectum, three or four times daily, and retained within as long as possible, by means of a compress, if necessary: Take of a strong infusion of *Hydrastis Canadensis*, two fluidrachms, tincture of Prickly-ash berries, twenty or thirty minims; mix for an enema. This gives tone and activity to the parts with which it comes in contact, and also to neighboring parts by sympathetic action. Tepid water, with a small amount of Glycerine, will also answer a very good purpose in some cases. Internally, agents, as a rule, prove irritating to the intestines, and should not be given. The massage treatment, over the bowels, will increase peristalsis and frequently be all that is necessary. Tincture of *Bryonia*, one drop in water, repeated two, three, or four times a day, will frequently be found very efficacious.

UMBILICAL HERNIA, may occur soon after birth, or at a later period. It may be occasioned by a large umbilicus, or, from straining while crying, coughing, etc. It should always be attended to at once. Place the child on its back, with the shoulders slightly elevated, and the thighs flexed toward the abdomen. Then carefully push the protruding tumor back, apply a compress over it, and maintain it in place by a bandage. In some instances, an umbilicus truss may be required, several kinds of which are in use, but I prefer those manufactured by **Max Woche & Son**, or by **Mr. W. Autenreith**, of this city, surgical instrument makers, who manufacture very available trusses for this and other forms of hernia. The compress, above advised, may be made of linen, folded several times, and moistened with some astringent; or, a piece of cork, may be cut of the proper size and shape, covered with linen or soft leather, and applied. Adhesive inflammation, sufficient to unite the parts, will take place in four or five days, though the treatment should be continued for twelve or fourteen days; and after this period has passed, the abdomen should be properly supported by a bandage, for, several months, in order to prevent a return of the rupture; and constipation should carefully be guarded against by proper laxatives, etc.

EXCORIATION OF THE NAVEL may be successfully treated by washing the part twice a day with some Castile soapsuds, and then dressing it with the Red Oxide of Lead plaster, or the compound Lead ointment; or frequently a few applications of Tannate of Glycerine will be all that is needed. If there is a tendency to gangrene, Sulphate of Zinc, either in powder or solution, may be applied, together with emollient poultices; and the strength of the system should be kept up by tonics.

Sometimes, from a shrinking of the umbilical cord, or from its being carelessly tied, the ligature will not press sufficiently on its blood-vessels, and a HEMORRHAGE will take place. In such cases, a second ligature must be applied below the original one, and which should make the proper compression upon the vessels without cutting the cord.

Occasionally, at the time of the separation of the cord from the navel, or a day or two subsequently, HEMORRHAGE FROM THE UMBILICUS, will ensue, being frequently accompanied with fungus growths. This difficulty may be overcome by the application of Sulphate of Zinc, either in powder or in solution followed by the red oxide of Lead plaster, or, compound Lead ointment; and, if much inflammation be present, emollient poultices should be applied.

NÆVUS MATERNI, or *mother's marks*, are frequently met with; they may exist on any part of the body, and present various appearances, some being better supplied with blood than others. When they are superficial, manifesting no tendency to spread, no treatment is required, except to remove the disfiguration from the face. When they are of the character of "aneurism by anastomosis," having a tendency to spread or enlarge, to ulcerate, or to bleed profusely, it is advisable to remove them when possible.

Various modes of TREATMENT have been recommended for the removal of these marks, to which I will merely make a brief reference; as, destruction of them by the application of platinum wire, heated by galvanism; the injection of a small quantity of the solution of Perchloride of Iron into various parts of the nævus; the application of the ligature to some varieties; the application of intense cold over the part; and, in the subcutaneous form, it has been removed by vaccinating in the mark. The application of powdered Sulphate of Zinc over the nævus, repeated daily, and continued until it is destroyed, then facilitating the removal of the slough by an Elm poultice, and

subsequently treating the ulcer with the compound Lead ointment, has succeeded in several instances in effecting a cure, even in cases where the *nævus* assumed a malignant appearance. If not removed after the slough has passed off, renew the application of the Zinc, and follow by the same treatment as above.

Infants are occasionally troubled with a condition, known as being **TONGUE-TIED**. This arises from the *frænum linguæ*, or bridle under the tongue, being so short, or attached so far forward as to interfere with the motions of the tongue in sucking, as well as in speaking, when further advanced in years; occasionally, it is owing to the presence of a false membrane. If the infant can protrude the tip of the tongue beyond the lips, or can suck well, no interference is demanded, for there is no difficulty of the kind. It is of very rare occurrence.

The **TREATMENT** consists in cutting the *frænum*, so as to loosen the tongue from its attachment. The best time for operating is when the infant sleeps; the tongue may then be held up with the index or forefinger of one hand, while with the other, holding a pair of blunt scissors, and having its points directed downward and as near the floor of the mouth as possible, cut loose about one-eighth of an inch of the anterior portion of the membrane—and which will be followed by only a few drops of blood which must be wiped out. Care must be taken not to cut the lingual artery, which is situated on the inferior surface of the tongue; and, should it be imprudently cut, the hemorrhage must be checked by compression, or the actual cautery. If too extensive a cut be made, the child may swallow its tongue, which, however, may be returned, by passing a spoon dipped in molasses or syrup down to the point or edges of the organ, and bringing it back.

HYDROCELE, is sometimes met with in infants, and is generally removed by the application of compresses moistened with a solution of Muriate of Ammonia. It is rare that a puncture will be required.

Infants, soon after birth, are sometimes troubled with a **SWELLING AND HARDNESS OF THE BREASTS**, which may be owing to cold, blows, bruises, or, an excited condition of the parts. It may be overcome by gentle frictions with Olive Oil and tincture of Camphor applied two or three times a day, employing in the intervals fomenta-

tions of Mullen leaves and blossoms, or a weak solution of Arnica; if there is much inflammation, poultice of Elm and Lobelia may be applied. Occasionally, and especially if neglected, or improperly treated, sloughing will take place; this may be treated by stimulating washes, and the red oxide of Lead plaster, in conjunction with tonics internally, when there is much debility.

HARE-LIP, is an imperfection often met with after birth. It is a perpendicular or oblique division of the upper lip, either immediately under the septum of the nose, or under one of the nostrils. Double hare-lip is when there are two divisions. Sometimes the fissure extends back through the palate bone, as well as through the soft palate, in which case, an operation has sometimes been performed, which may be found described in surgical works.

In ordinary cases of hare-lip the deformity is removed by a simple operation; and, on account of the tendency to convulsions in very young children, after the operation, it is better to wait until they are at least two or three weeks old; a year or two is still better, if the child can suck, or be safely fed in the meantime.

The operation is performed, by removing the edges of the fissure with a pair of long-handled, sharp scissors, made for the purpose. Should the gum and lip be adherent, they must be separated by the knife; and when the frænulum is in the way of the operation, it must be divided. The incision, by whatever instrument it is effected, should be as smooth and even as possible, that the edges may readily unite by the first intention.

The fissure, now resembling the inverted letter Λ , is to be closed, bringing the edges together by means of silver wire. The first suture should be introduced through and across the wound at its inferior lower termination; it should penetrate sufficiently deep, say about two-thirds through the substance of the lip, to keep the cut surfaces in approximation, but should not pass through the inner surface of the lip. One or two other sutures are then to be passed similarly, at equidistant points from the first, being thrust, as before, sufficiently deep to almost reach the inner mucous lining of the lip. The wire is to be twisted sufficiently to keep the outer surface of the wound in close contact, being careful, however, not to apply them so tightly as to occasion a subsequent sloughing of the parts. Should high inflammatory action supervene, it may be reduced by the application of cold water; and any tendency to cerebral irritation, or sympathetic fever, should be at once removed by appropriate means.

The child should be kept in a room, away from any excitement which would occasion crying or laughing, and even talking, when old enough, and must be fed with a spoon, the diet being entirely of a fluid character. And should there be any danger of a disarrangement of the parts, the cheeks may be pressed forward, and then a long strip of adhesive plaster, reaching from ear to ear, may be applied between these points and over the lip.

After four, five, or six days, the sutures may be removed, and strips of adhesive plaster applied, which will be sufficient to hold the parts together. In removing the sutures, loosen them gradually with the forceps, as any sudden jerks, or forcible pulling, would be apt to separate, or otherwise injure the wound. If there be a double hare-lip, it will be better to complete the operation by incising and ligaturing both fissures at the same time.

CHAPTER LIII.

APHTHÆ, THRUSH — TRISMUS NASCENTIUM — PORRIGO LARVALIS, MILK SCAB.

INFANTS are subject to an inflammation of the mouth, called APHTHÆ, *Thrush*, or *Stomatite Folliculeuse*, the symptoms of which vary according to the severity of the attack. Upon an examination, the tongue, lips, and interior surface of the mouth and throat, will be found more or less covered with small, white flakes, or pearl-colored vesicles, which proceed to superficial ulceration, and terminate by an exfoliation of white crusts. These vesicles may be distinct, or confluent, and in the more severe forms, are accompanied with so much pain that the child can not suck, its mouth is hot, its lips frequently swollen, with a dribbling of saliva. The breath is usually disagreeable and of an acid odor, the pulse quick and feeble, bowels deranged, frequent vomiting, and a diarrhea with green or watery evacuations, and excoriated anus. The disease may extend to the pharynx, and trachea, and, in very severe cases, it is continued through the alimentary canal to the anus. The child becomes pale, restless, and fretful, rapidly emaciating, and presenting a countenance indicative of much distress. When mild, but few of these symptoms are manifested; but when very severe, there may also be cephalic disturbance, severe abdominal pain, diarrhea, and typhoid symptoms, under which the little patient will rapidly sink. Occasionally the ulcers assume a gangrenous condition.

Weakly and unhealthy children, as well as those raised by hand, are more subject to this disease than others; it may also be induced by improper food, uncleanness, unhealthy air, and not unfrequently occurs as a secondary affection to other diseases.

It is sometimes mistaken for a disease occasionally met with, called *White Thrush*, or *Muguet*, but may be distinguished, by remembering that this latter affection presents no ulceration, being a deposition of curdy matter or false membrane upon the epithelium, without involving the destruction of the adjacent membrane; while in true Thrush, the follicular points of the tongue enlarge, without losing their circular form, and from their central orifices a whitish matter escapes, being accompanied by ulceration. The ulcer has rounded edges, is more or less tumefied, and is invariably surrounded by an inflamed red circle.

In the mild form, the white crusts fall off, and in a few days the ulcers heal. But when the aphthæ are confluent, with extensive ulceration, vomiting, and diarrhea, or when the crusts, instead of being white, are of a dark color, with an unhealthy appearance of the ulcers, the pulse being quick and feeble, with rapid emaciation, the prognosis is very unfavorable.

TREATMENT.—In the milder forms of this disease little or no treatment is necessary, but in the severe forms it is indispensable. The treatment should be commenced by proper attention to diet; frequently, where the child is fed from a bottle, the bottle is allowed to become sour and filthy, and proper attention to cleanliness will overcome the trouble, or the addition of Lime-water to the milk answers well in other cases; it may become necessary, however, to change to a wet nurse. It will be well in most cases to obtain the effect of some mild agent to move the bowels, as the Aromatic Syrup of Rhubarb. After and during the action of the laxative—which should be exhibited daily, at least for a few days—two or three drops of the tincture of Chloride of Iron should be given in a sufficient quantity of infusion of Hydrastis Canadensis, or Fluid Hydrastis, and this may be repeated every two, three, or four hours, according to the severity of the disease. I have heretofore made a brief reference to the action of this chalybeate, so that it will be unnecessary here. I have gotten very good results, in this trouble, from the use of Borax, either in powder or solution; some prefer to use it in honey.

Care must be employed not to irritate the mouth by rough swabbing, or by forcing off the white flakes or deadened epithelium, as either of these may augment the severity of the disease. There are

other agents which may be used with advantage as local applications, as *Hamamelis Virginica*, a solution of Alum, or Nitrate of Silver, etc.; but I prefer the above, which I have employed with much success in a number of cases, always administering some of it internally. Chlorate of Potassa internally, and applied locally, in solution, has been found a very efficacious remedy in most cases. I have used it in a few cases, and with advantage. Sulphite of Soda one drachm, Distilled Water one fluid ounce, Carbolic Acid two or three grains, mixed together, and applied upon the aphthæ by means of a camel's hair pencil, has often proved highly efficacious.

When vomiting occurs, Aconite and Ipecac, or *Nux Vomica*, in minute doses, may be used, or, in some cases, Bismuth may answer a better purpose; and if the irritation has extended into the stomach or alimentary canal, we will again find the Aconite and Ipecac useful, or an infusion of the bark of the twigs of Peach-tree will often act well. Perhaps Cod-liver Oil, or Coconut Oil, might be useful in some cases. When the ulcers assume a dark or brown hue, or exhibit a gangrenous tendency, equal parts of Salad Oil, Yeast, and Spirits of Nitric Ether, may be given in doses suited to the child's age, and which should be repeated at proper intervals. Or some of the agents heretofore named for such condition may be used, as, the Sulpho-carbolites, Baptisia, diluted Nitric acid, Permanganate of Potassa, etc. In addition to this, the system should be supported by Quinia, Iron, and cordials, as wine-whey, milk and wine, chicken-broth and wine, etc. Sometimes the Iodide of Potassium, or, Iodide of Iron, combined with some alterative, will be found valuable, especially with children of scrofulous parents.

When there is excoriation of the anus, it should be frequently and gently bathed with warm water, dried carefully, and then sprinkled with Bismuth or finely powdered Elm Bark, or dressed with Tannate of Glycerine.

The body of the child should be kept clean, frequently bathing it with warm water, or a weak alkaline solution; and if it be much debilitated, brandy or some other stimulant may be added to the solution. Attention should be paid to the condition of the mother's health, who must be placed under treatment if necessary: her diet must invariably be regulated, as well as the condition of the bowels, exercise, etc. It not unfrequently occurs, that a change of the nurse, or weaning the child and feeding it cow's milk, arrowroot, barley-water, etc., will be followed by a disappearance of all the symptoms: shortly after which, if the mother's milk has not been allowed to "dry up," it may be safely restored to its natural food. (See *Innutation*.)

Among the several cutaneous diseases to which infants are liable, is one known as *milk scall*, or *milk scab*, and which has been variously termed by writers, thus, *Porriigo Larvalis*, *Crusta Lactea*, *Porriigo Favosa*, *Tinea Lactea*, etc. The disease is usually first observed upon the forehead and cheeks, and consists in an eruption of minute superficial pustules, of a yellowish-white color, united in groups on a red surface, and more or less confluent. It sometimes attacks the hands, feet, and other parts of the body, and has likewise been observed in adults. The pustules will at first be found to contain a transparent fluid, which soon becomes yellowish-white and opaque, and being discharged, concretes into thin, yellowish, or greenish crusts. As the pustular patches spread, there is a renewal of the discharge, which likewise continues from beneath the crusts, increasing their thickness and extent. The eruption is subject to various modifications—sometimes the discharge is scarcely perceptible, with a dry and brown scab covering the surface; at other times, the discharge is profuse, with a red and excoriated surface. Occasionally, the whole face, with the exception of the nose and eyelids, is covered like a mask, with a large, thick crust, formed of numerous smaller ones, and, almost invariably, the disease is accompanied with intense itching, and more or less pain. When the disease is about terminating, the discharge gradually ceases, the crusts fall off and are not renewed, the surface under them, at first elevated, red, and tender, gradually lessens in color, slight desquamation ensues, and the skin slowly returns to its normal condition without any disfiguration, unless the child has been allowed to tear its cheeks by scratching.

The duration of the disease is variable, and it is not uncommon for it to remain several months before disappearing. It rarely remains beyond the period of teething, and hence, in obstinate cases, means should be employed to allay the itching, that the face may not be marked by the nails of the child. It does not appear to be contagious; and its causes are involved in much obscurity.

TREATMENT.—Microscopic investigations are stated to have discovered that the disease depends upon a vegetable parasitic growth, and may be cured by the local application and internal administration of a solution of Sulphite of Soda in some bitter tonic. I have recently employed this solution internally, together with a solution of Perchloride of Iron locally, to the aphtha, with marked benefit; in some instances, solution of Chlorate of Potassa may be substituted for that of the Ferruginous Perchloride. Carbolate of Iodine, as a local application, will be found highly advantageous in many instances.

If there is any derangement of the digestive or hepatic functions, administer laxative doses, every day or two, of the Aromatic Syrup of Rhubarb. The minute dose of Chionanthus answers well in some cases; in others, Sp. Tr. of Iris may be given; and again, the action of Nux Vomica or Fowler's Solution is desirable. Good effects may likewise be derived by the administration of Rhus Tox. The diet of the child should be regulated as to quantity, and the periods of feeding; in several cases the disease has proved unyielding until the child was given to another nurse, when it rapidly disappeared.

The child should be exercised freely by its attendant, and be exposed as much as possible to the open atmosphere, in pleasant weather.

CORYZA, *Nasal Catarrh*, or *Snuffles*, is a very common and troublesome disease among infants. It is an affection of the nasal mucous membrane and air passages of the head, and generally commences by frequent sneezing; at first there is little discharge from the nostrils, but in a short time, a thin mucous secretion takes place, which finally becomes profuse, and of a thick, muco-purulent character. Not unfrequently, the discharge is acrid and irritating. The mucous fills the passages, forming a very troublesome obstruction, causing the child to make a snuffling or rattling sound in breathing through the nose, and interfering with its free respiration while sucking. The eyes are more or less suffused, watery, and sensitive to light, and the thirst is increased, with some slight febrile disturbance. Sometimes, especially when the disease appears epidemically, the symptoms are much more severe, with great constitutional debility. After the third or fourth day the symptoms usually diminish, but, and especially when not under treatment, or in the severe forms, it may continue for several weeks.

Coryza is usually produced by cold; at times it prevails as an epidemic; and it is frequently found accompanying other diseases, as the exanthemata. Usually the disease requires but little treatment, but in its severe forms, it must be watched, as the child may die from the obstruction preventing free access of atmospheric air to the lungs.

TREATMENT.—In mild cases, inunction of the nostrils will frequently be all the treatment needed; for this purpose Vaseline answers, or, what some consider still better, an application of goose-grease or tallow may be used. This greasing of the nose and forehead externally is a common practice with nurses, and I have found it

decidedly beneficial; and, notwithstanding many of our eminent practitioners treat with disdain the simple measures advised by old nurses, it is well to remember that they are more observing of, and have better opportunities to ascertain, the influence of agents upon children than physicians, who seldom remain with a patient to exceed fifteen minutes at a visit; and he who will listen to and watch the opinions and methods adopted by them, especially in the management of infants, can never fail to derive some useful and valuable suggestions.

In the severe forms of this disease, the patient is put upon the use of the sedative. Aconite, in the small dose, will be the usual remedy; this may be aided in its action by the hot bath. When the discharges become acrid, and the membranes show decided irritation, Rhus Tox should be given with the Aconite. The indication for Gelsemium will frequently be present, as well as that for Belladonna. Frequently there will be an enlargement of the lymphatic glands about the neck; such a condition calls for Phytolacca. Specific medication acts very promptly in children's diseases; consequently, the symptoms should be carefully noted, and the indications followed.

When the nose is much obstructed, the infant should be taken from the breast for a few days, and be fed at regular intervals, two or three times a day. Children two or three years of age should be kept on a low diet during the first stage of the disease. The surface should be bathed with warm water daily, the body should be kept properly warmed, and a flannel cap should be worn, not only during the disease, but for some days after its cure.

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